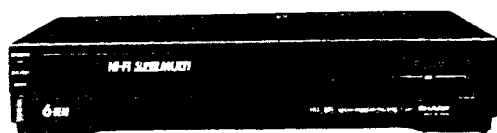


SHARP SERVICE MANUAL

S90N9VC-90ET/

VHS VIDEO CASSETTE RECORDER


MODEL VC-90ET

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

CONTENTS

	page
• SPECIFICATIONS	2
• DISASSEMBLY AND REASSEMBLY.....	3
• FUNCTION OF MAJOR MECHANICAL PARTS	4
• ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS	6
• ADJUSTMENT OF ELECTRICAL CIRCUITRY	32
• TROUBLESHOOTING GUIDE	45
• BLOCK DIAGRAM	59
• WAVE FORMS	85
• SCHEMATIC DIAGRAMS	89
• WIRING SIDE PWBs	107
• REPLACEMENT ELECTRICAL PARTS LIST	111
• EXPLODED VIEWS	124
• PACKING OF THE SET	129

SPECIFICATIONS

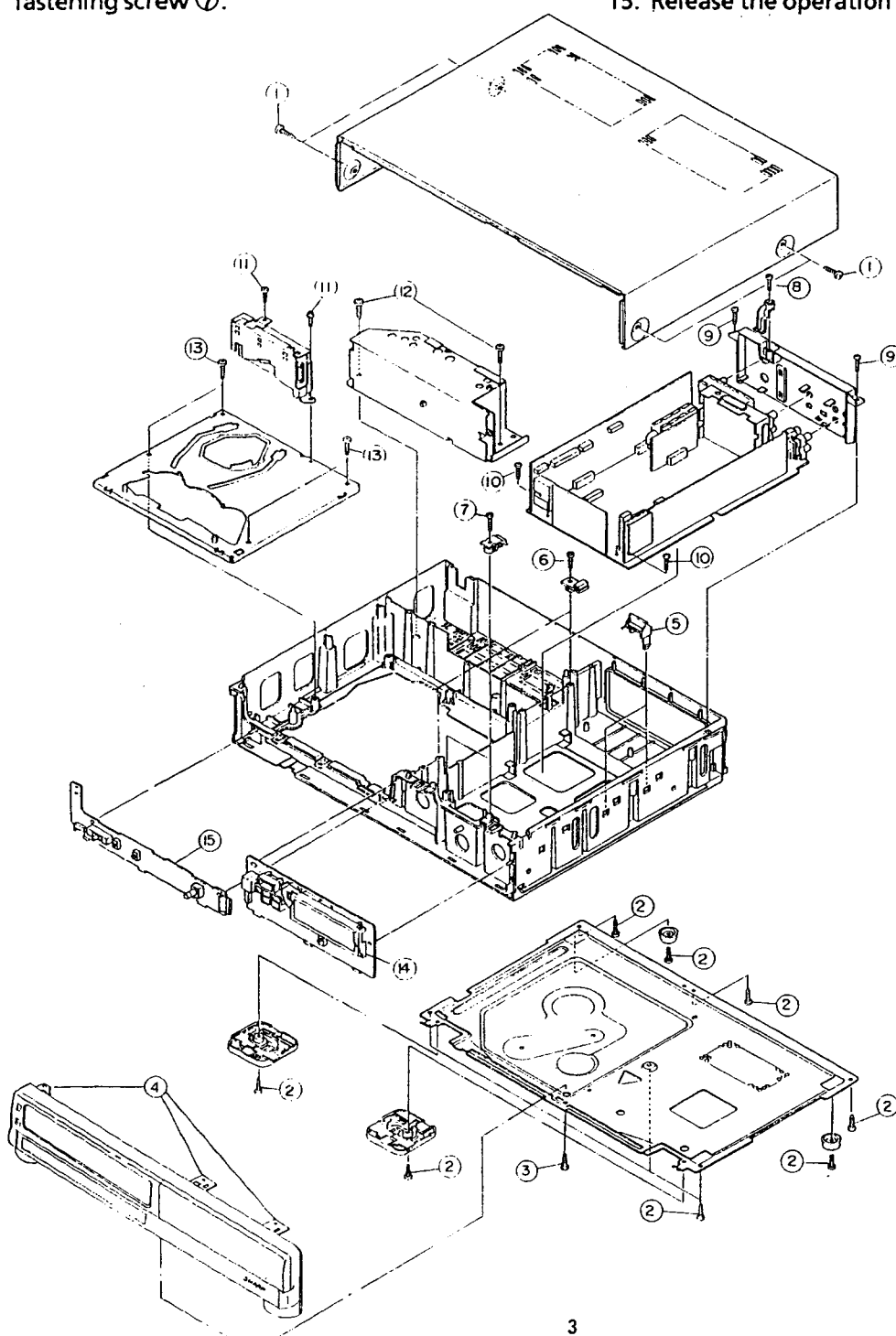
Format:	VHS PAL, SECAM MESECAM, NTSC standard
Video recording system:	Rotary, slant azimuth two head helical scan system
Video signal:	PAL, SECAM, NTSC colour or monochrome (CCIR System B/G, I, D/K, M) signal
Recording playing time:	240 min max. with SHARP E-240 tape (PAL/MESECAM/SECAM in SP mode) 8 hours max. with SHARP E-240 tape (PAL/MESECAM/SECAM in LP mode) 160 min max. with SHARP T-160 tape (NTSC in SP mode) 8 hours max. with SHARP T-160 tape (NTSC in EP mode)
Tape width:	12.7 mm
Tape speed:	23.39 mm/sec. (PAL in SP mode) 33.35mm/msec. (NTSC in SP mode) 11.7 mm/sec. (PAL in LP mode) 16.68mm/msec. (NTSC in LP mode) (PB only) 11.12 mm/sec. (NTSC in EP mode)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF E2~E12, (44.25MHz~295.25MHz) UHF E21~E69, (471.25MHz~885.25MHz)
RF converter output signal:	UHF Channel E30~E39 (adjustable). Preset to Channel E36
Power requirement:	AC110~240V, AUTO 50/60 Hz
Power consumption:	Approx. 24W (at AC220V 50Hz)
Operating temperature:	5°C to 40°C
Storage temperature:	- 20°C to 55°C
Weight:	5.5 kg
Dimensions:	430 mm (W) × 348 mm (D) × 89 mm (H)
VIDEO	
Input:	0.5~2.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
AUDIO	
Input:	Line: - 8 dB, more than 47k ohm (with - 4dB/ - 8dB ATT. SW)
Output:	Line: - 8 dB, less than 1k ohm
Accessories included:	Antenna 75 ohm coaxial connector cable (plug provided) Operation Manual SHUTTLE remote control Dry Battery AV Cable

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

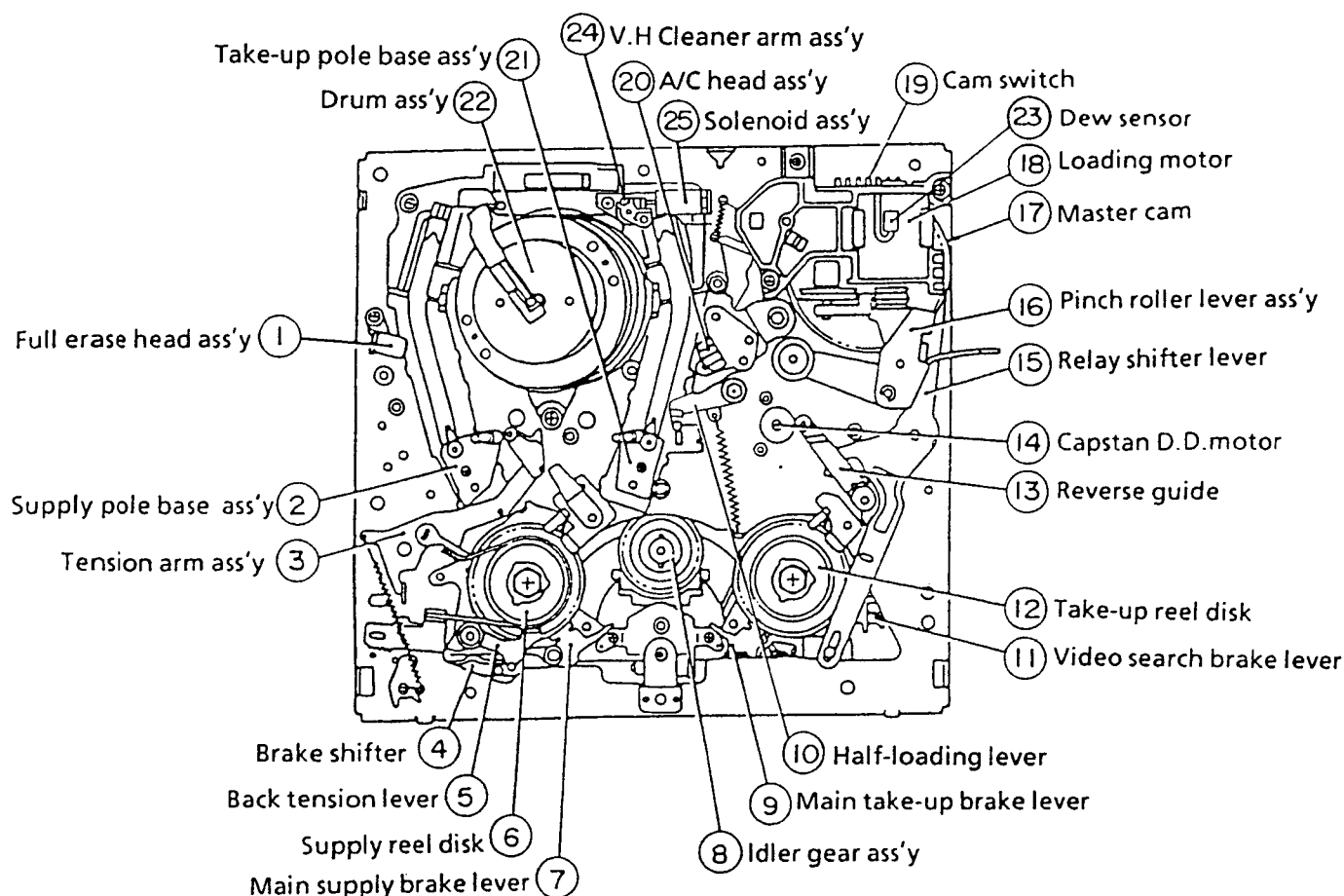
Note: The antenna must correspond to the new standard DIN 45325 (IEC 169-2) for combined UHF/VHF antenna with 75 ohm connector.

DISASSEMBLY AND REASSEMBLY

1. Remove the four upper cabinet fastening screws ①.
2. Remove the eight bottom panel fastening screws ②.
3. Remove the one front panel fastening screw ③.
4. Release the three clips ④ and remove the front panel.
5. Remove the HiFi PWB holder ⑤.
6. Remove the one SYSCON SERVO PWB Holder fastening screw ⑥.
7. Remove the one SUB CHROMA PWB Holder fastening screw ⑦.
8. Remove the one RF Converter Holder fastening screw ⑧.
9. Remove the two antenna terminal cover fastening screws ⑨.
10. Remove the two main PWB fastening screws ⑩.
11. Remove the two head amp PWB fastening screws ⑪.
12. Remove the two power unit fastening screws ⑫.
13. Remove the four mechanism chassis fastening screws ⑬.
14. Release the timer PWB ⑭ fastening clips.
15. Release the operation PWB ⑮ fastening clips.

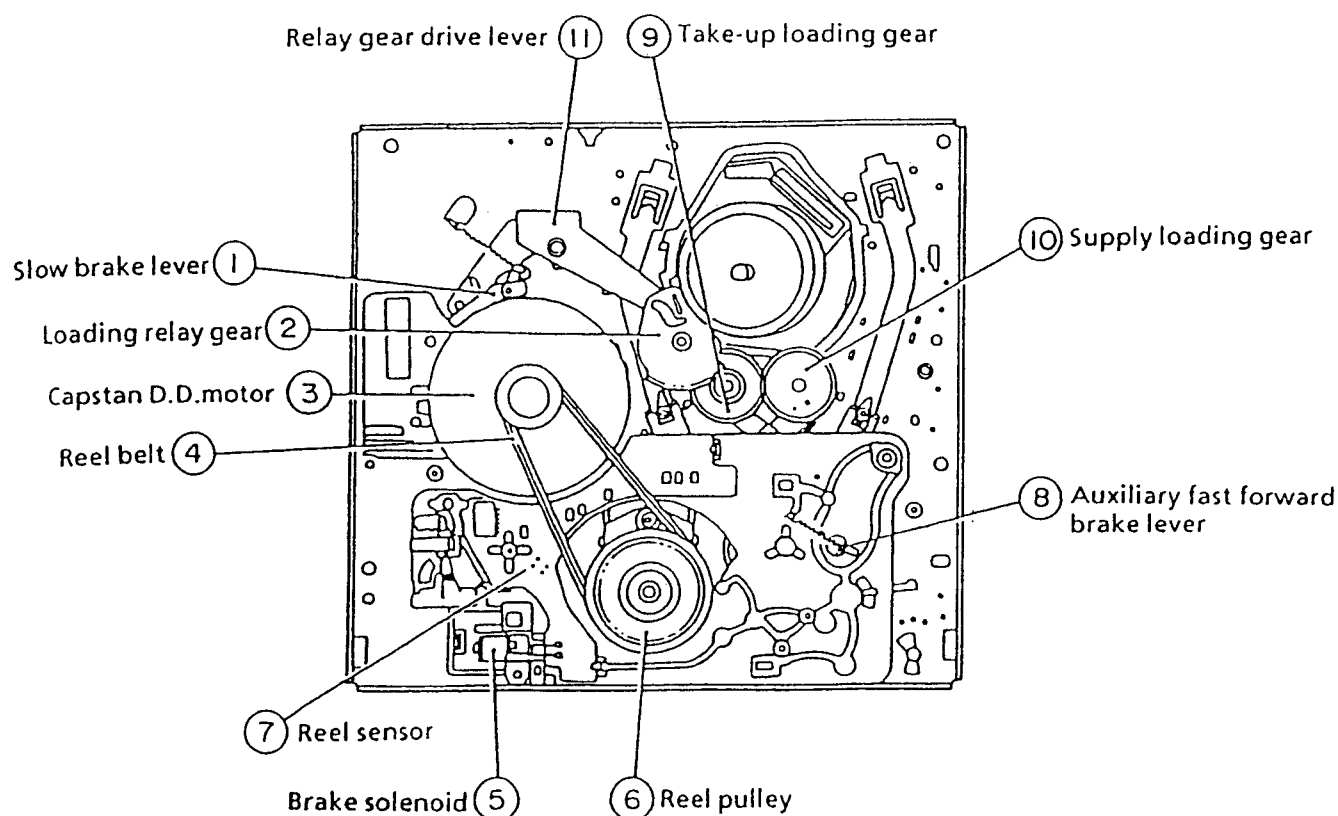


FUNCTION OF MAJOR MECHANICAL PARTS (TOP VIEW)



No.	Function	No.	Function
1.	Full erase head ass'y Erase the whole records on the tape in the recording mode.	13.	Reverse guide Pulls out the tape in the video search rewind mode, and controls the tape drive train height with the upper and lower guides.
3.	Tension arm ass'y Detects the tension of tape while running, and brakes the supply reel disk via the tension bane.	15.	Relay shifter lever Transmits the operation of the master cam to the brake shifter, and operates the reverse guide.
4.	Brake shifter Set the position of brake or the like in accordance with the modes such as stop and playback. Back tension lever.	16.	Pinch roller lever ass'y Press-fits the tape to the capstan during tape running. The right protrusion switches the clutch of the cassette housing control assembly in "tape eject", and makes the mechanism eject the tape.
5.	Back tension lever Bakes the supply reel disk to a certain degree to prevent tape slackening during "loading" and "shifting from playback to video search rewind".	17.	Master cam Turns clockwise during loading, and counterclockwise during unloading, and moves the shifter or the like in accordance with each mode.
7.	Main supply brake Brakes the supply reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.	18.	Loading motor A motive power which drives the mechanism. It transmits the power to the master cam and cassette housing control assembly via the belt.
9.	Main take-up brake Brakes the take-up reel disk to prevent tape slackening when the unit is stopped in fast forward or rewind mode.	19.	Cam switch Rotates synchronously with the master cam, and detects the position of each mode by means of the internal switch.
10.	Half-loading level Bring the tape in contact with the A/C head, putting it in half-loading state in the fast forward or rewind mode.	23.	Dew sensor Detects the generation of dew in the set. It stops the mechanical action of the set when finding any dew in the set.
11.	Video search brake lever It is in contact with the take-up reel disk normally, and brakes it to a certain degree. It applies larger brake in the video search rewind mode.		

FUNCTION OF MAJOR MECHANICAL PARTS (BOTTOM VIEW)



No.	Function	No.	Function
1.	Slow brake Gets in contact with the capstan D.D. motor linking to the master cam in the slow still mode, and brakes it to a certain degree.	7.	Reel sensor An element which sheds the light onto the reflection plate affixed to the bottom side of the reel disk, and detects the rotation of the reel disk through receiving the reflected light.
3.	Capstan D.D. motor A motive power which runs the tape. It transmits the power via the reel belt.	8.	Auxiliary fast forward brake lever Brakes the supply reel disk to a certain degree in the fast forward and rewind modes.
4.	Reel belt Transmits the power to run the tape to the reel pulley.	9.	Take-up loading gear Shifts the take-up pole base and guide roller via the loading relay gear, and applies the tape around the drum assembly, as well as transmits the power to the supply loading gear.
5.	Brake solenoid Adsorbs and holds the brake shifter in the fast forward and rewind modes, and releases it in the stop mode.	10.	Supply loading gear Shifts the supply pole base and guide roller via the take-up loading gear, and applies the tape around the drum assembly.
6.	Reel pulley Transmits the power of the capstan D.D. motor to the reel disk via the reel idler.	11.	Relay gear drive lever Transmits the movement of the master cam to the take-up loading gear via the loading relay gear.








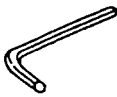

ADJUSTMENT, REPLACEMENT AND ASSEMBLY OF MECHANICAL UNITS

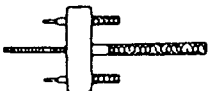
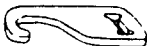



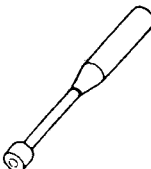


Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original working condition.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.	Price Code	Configuration	Remarks
1	Reel Disk Height Adjustment Jig	JiGRH0002	BR		These jigs are used for checking and adjusting the reel disk height
2	Master Plane	JiGMP0001	BY		
3	A/C Head Tilt Adjustment Jig	JiGACH-F18	BU		This Jig is used for setting the A/C head tilt.
4	Torque Gauge (90g)	JiGTG0090	CM		These jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2 kg)	JiGTG1200	CN		
5	Gauge Head	JiGTH0006	AW		
6	Cassette Torque Meter	JiGVHT-063	CZ		This cassette torque meter is used for checking and adjusting the torque of take-up for measuring tape back tension.
7	Tension Gauge (300g)	JiGSG0300	BF		There are two Gauges used for the tension measurements, 300 g and 2.0 kg.
	Tension Gauge (2.0kg)	JiGSG2000	BS		
8	Hex Wrench (0.9mm)	JiGHW0009	AE		These Jigs are used for loosening or tightening special hexagon type screws.
	Hex Wrench (1.2mm)	JiGHW0012	AE		
	Hex Wrench (1.5mm)	JiGHW0015	AE		
9	Alignment Tape (NTSC)	VR0ATSV	CD		These Tapes are especially used for electrical fine adjustment.
	Alignment Tape (PAL)	VR0CPSV	CD		
	Hi-Fi Alignment Tape (PAL)	VR0CBFFS	CB		
	Alignment Tape (SECAM)	VR0CSSV	CK		
	HiFi Alignment Tape (NTSC)	VR0ATFPS	CA		

No.	Jig Item	Part No.	Price Code	Configuration	Remarks
10	Drum Replacing Jig	JIGDT-0001	BG		This is used for replacement of the VCR's upper drum.
11	Tension Gauge Adapter	JiGADP003	BK		This Jig is used with the tension gauge. Rotary Transformer Clearance Adjusting Jig.
12	Special Bladed Screwdriver	JiGDRiVERH-4	AP		This Screwdriver is used for adjusting the guide roller height.
13	Tension Band and Plate Adjustment Jig	JiGDRiVER-6	BM		This Jig is used for adjusting the tension band and tension plate.
14	Torque Driver (5kg)	JiGTD1200	CB		This is used to screw down resin-made parts: the specified torque is 5 kg.
15	Box Driver	JiGDRiVER110-7	AS		This Jig is used for height adjustment of the A/C head.
		JiGDRiVER110-4	AV		This Jig is used for height adjustment of the retaining guide and X-position.
16	Retaining Guide Height Adjustment Jig	JiGGH-F18	BU		This Jig is used for height adjustment of the retaining guide.
17	Retaining Guide Height Adjustment Jig	JiGRVGH-F18	BU		This Jig is used for height adjustment of the reverse guide.

NOTE:

Current JiGMA0001 contains Master Plane (JiGMP0001) and Disk Height Adjusting Jig (JiGRH0001).

Even though new Disk Height Adjusting Jig (JiGRH0002) covers greater height, this new Jig (JiGRH0002) can be used for current JiGRH0001, but current Jig (JiGRH0001) cannot be used as JiGRH0002.

Master Plane (JiGMP0001) can be used with JiGRH0001 and JiGRH0002 as well.

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts	Maintained	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Possible symptom encountered	Remarks
Guide roller ass'y		□	□	□	□	□	Lateral noises Head occasionally blocked	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller		□	□	□	□	□		Clean with pure high quality isopropyl alcohol.
Supply impedance roller (inner)			□		□	□		Clean tape contact area with the specified cleaning liquid.
Supply impedance roller flange		□	□	□	□	□		
Retaining guide		□	□	□	□	□		
Slant pole		□	□	□	□	□		
Video head		□	○□	□	○□	○□	Poor S/N ratio, no color	Clean tape contact area with the specified cleaning liquid.
Full-erase head		□	□	□	□	□	Poor color, beating	
A/C head		□	□	□	□	□	Sound too small or distorted	
Capstan D.D. Motor		□	□	□	□	○	No tape running, uneven color	
Pinch roller		□	□	□	□	○	No tape running, tape slack	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt			□		○	□	No tape running, tape slack, no fast forward/rewind motion	
Loading belt/Cassette loading belt			□		○	□	Cassette not loaded or unloaded	
Tension band ass'y						○	Lateral image swing	
Loading motor						○	Cassette not loaded or unloaded	
AHC (Automatic Head Cleaner)			○		○	○		Replace the roller of the cleaner when it wears down. Just change the video head cleaner arm assembly for new one.
Reel block*							See the chart below	
*See the table below for servicing the reel block parts.								
Supply/Take-up reel disks			□△		△○	□△	No tape running, tape slack	Clean with pure high quality isopropyl alcohol.
Main supply/take-up brake levers					○		Tape slack	
Video search brake lever					○			
Idler gear ass'y					○		No tape running	
Reel Pulley			□△		□○	□△		

NOTE: ○: Part replacement.
 □: Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
 △: Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000 hrs).

This model has no adjusting parts for torques, tensions, etc. If the reading is outside the specified range, clean or replace the part.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

● Removal

1. Set the cassette ejected condition in the cassette eject mode.
2. Unplug the recorder from the main source.
3. Follow the procedures below in the specified order.
 - a) Remove the cassette loading belt ①.
 - b) Disconnect the FFC (Full Flat Cable) ②.
 - c) Remove the cassette housing installation screws ③.
 - d) Slide and pull out the cassette housing control assembly upward ④.

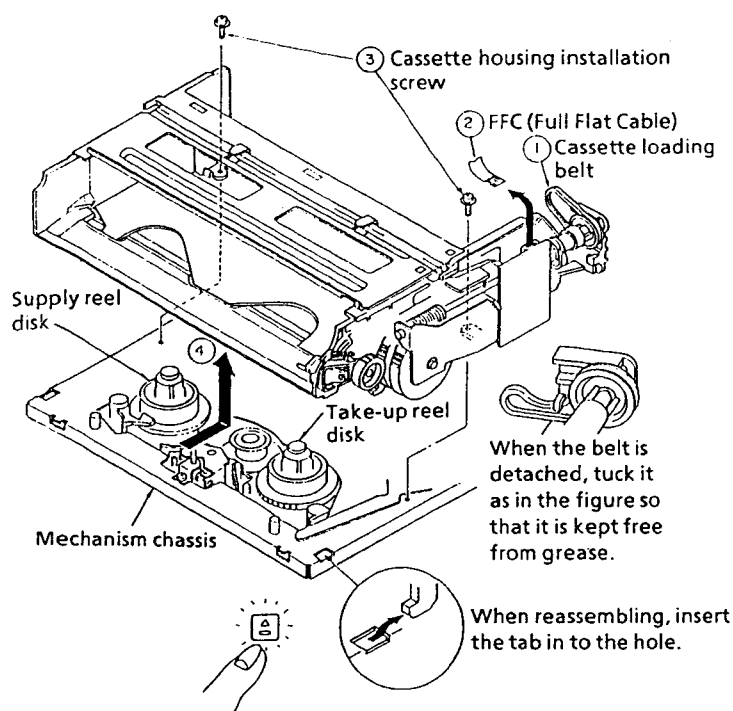


Figure 1-1.

● Reassembly

1. Before installation of the cassette housing control assembly, place the unit in the stop mode with the power on, then unplug the power cord. (The main body is placed in the eject mode.)
2. Follow the procedures for removal in the reverse order.

Notes:

1. Be sure to unplug the power cord in removal and reassembly.
2. Keep the cassette loading belt free from grease. In case of its adhesion, clean the belt.
3. In using a magnet screw driver, be sure to keep it away from the A/C head, FE (Full Erase) head, or the drum.
4. In removal and reassembly, take care not to hit the cassette housing control assembly or tools against the guide pin, drum, or the like thereabout.

5. Place the unit in the eject mode in removal or reassembly of the cassette housing control assembly.
6. Load the cassette once onto the cassette housing control assembly after reassembly. (If the cassette housing control assembly normally operates after this, the phases of mechanism and the cassette controller are accurately adjusted after ejection.)

MECHANICAL OPERATION CHECK WITHOUT CASSETTE

When power is on, the general operations of the mechanism can be checked without a cassette. Note the following points.

1. Check video search rewind and rewind, rotating the take-up reel disk ⑤ by hand (in either normal or reverse direction). If it is not rotated, the reel sensor works to shift the mechanism to the eject mode.
2. When the stop button is pressed, the mechanism does not stop at a normal stop position. It shifts to the eject mode and stops.
3. When the stop button is pressed in the playback, video search rewind, and video search forward modes, the supply reel disk ⑥ keeps on rotating for several seconds for elimination of tape slack in the course of shifting to the eject mode. In such a case, rotate the take-up reel disk ⑤ somewhat by hand, and the supply reel disk ⑥ stops, which can reduce the working time.

REPLACEMENT OF WORM WHEEL ASSEMBLY

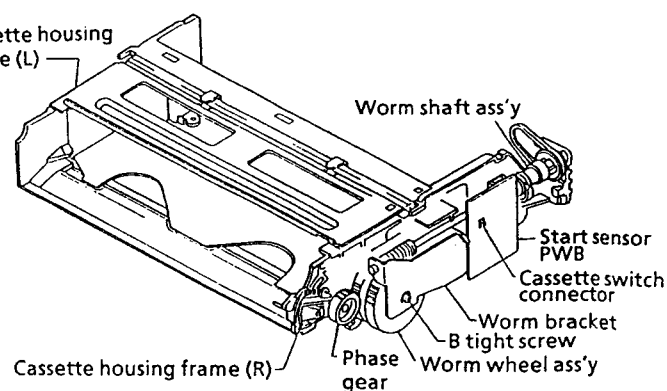


Figure 1-2.

● Removal

1. Unsolder the cassette switch connectors from the start sensor PWB.

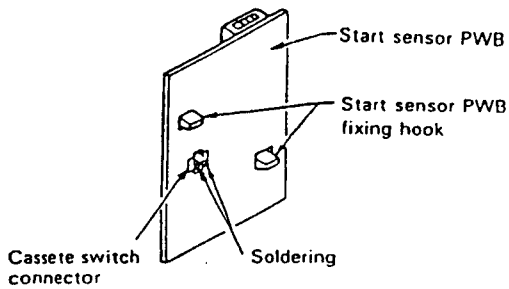


Figure 1-3.

2. Lift the start sensor PWB pressing the two start sensor PWB fixing hooks inward.

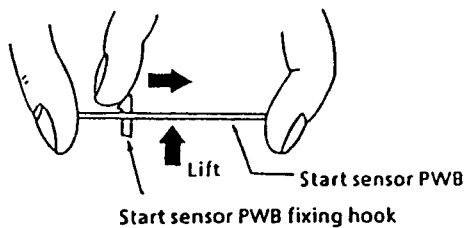


Figure 1-4.

3. Unscrew one B tight screw to detach the worm bracket.

Note:

The worm shaft bearing can easily come out of position. So be careful not to lose it.

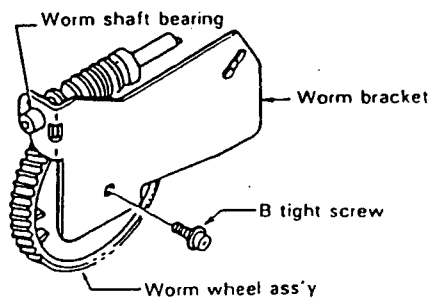


Figure 1-5.

4. Remove the worm shaft assembly, pulley, and cassette loading belt all from the cassette housing frame (R).

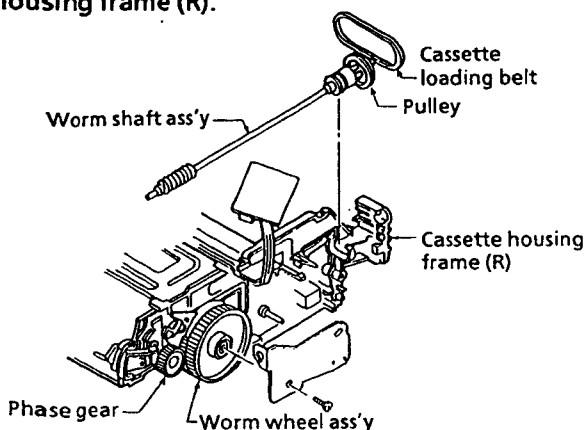


Figure 1-6.

5. Place the slider pin just above the worm wheel assembly (Figure 1-7). (The retainer of the slider is locked at two positions when. So unlock it as in the Figure 1-8.)
6. Pull out the worm wheel assembly toward you pressing the switch lever upward. (Figure 1-7)

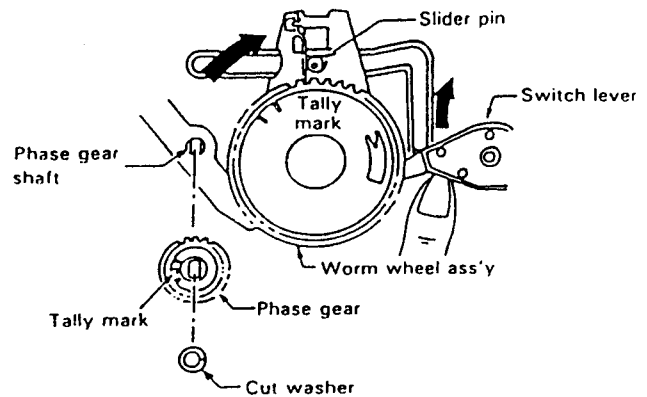


Figure 1-7.

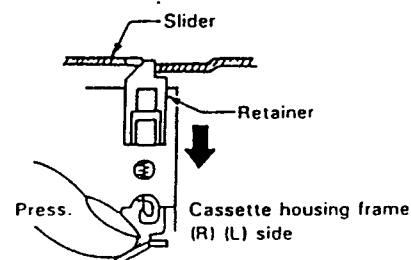
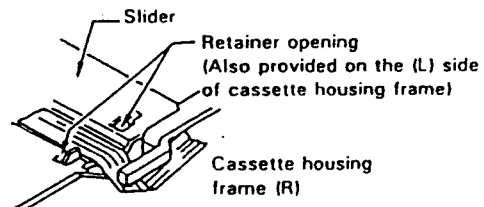


Figure 1-8.

● Reassembly

1. Turn the phase gear clockwise until the slider comes to a halt in the cassette insertion direction. (See the Figure 1-9.)
2. Insert the set up worm wheel gear assembly into the cassette housing frame (R), matching the mark on the phase gear with the mark on the worm wheel gear. Detach the cut washer on the phase gear assembly and the phase gear for easier installation of worm wheel assembly.

Note:

Make sure that the slider pin is in the groove of the drive gear arm.

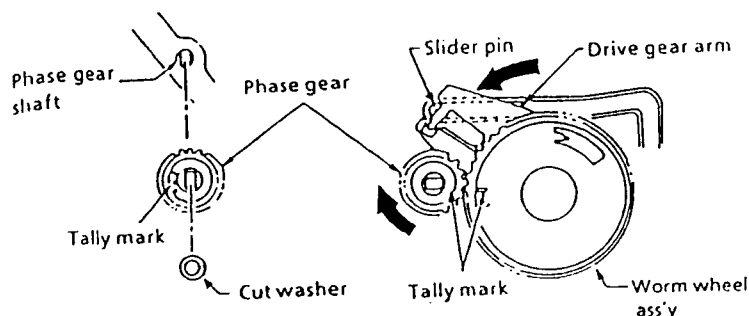


Figure 1-9.

3. Install the pulley and the cassette loading belt on the worm shaft assembly. Couple the clutch to the clutch lever. And mount them together in the cassette housing frame (R).

Note:

Keep in mind that the clutch switching lever should be in the correct position. The mechanism might malfunction if the lever is slightly out of position. (See page 12.)

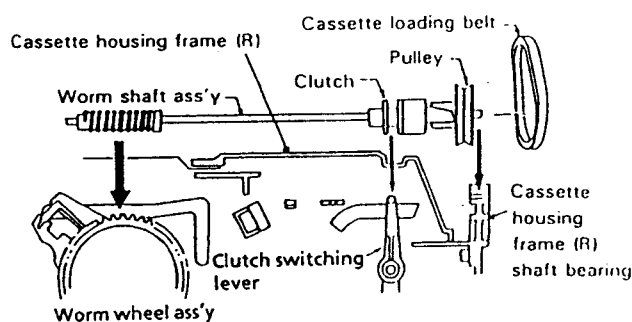


Figure 1-10.

4. Attach the worm bracket to the worm shaft assembly. Place them onto the boss on the cassette housing frame (R).

Note:

Insert ① before screwing into ② and ③.

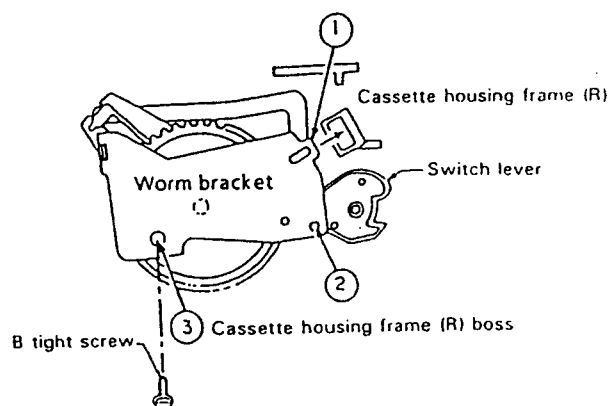


Figure 1-11.

5. Tighten one B tight screw.

Note: Do not overtighten the B tight screw (no more than 5.0 ± 0.5 kg.cm), because the lower threads of the screw hole at the resin-mode boss can be broken.

6. Place the start sensor PWB on the cassette housing frame (R).

Note: Check that the switch connectors are in the cassette switch mounting hole.

7. Finally resolder the cassette switch connector to the start sensor PWB.

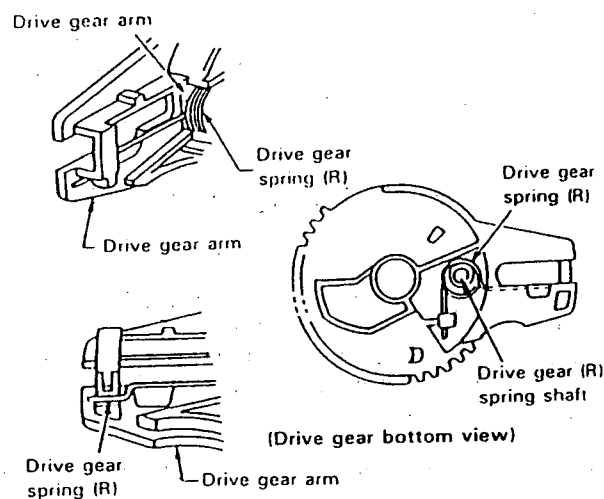
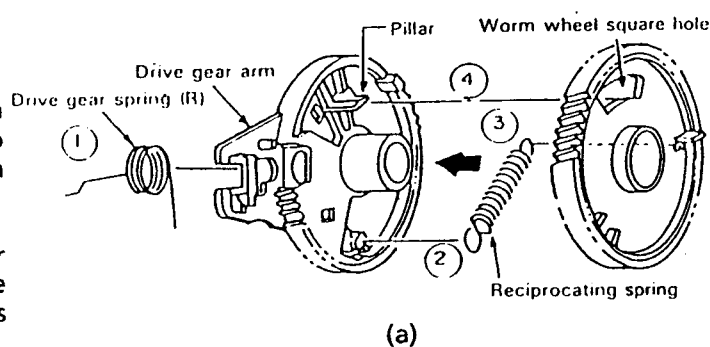
REASSEMBLY OF DRIVE GEAR

Figure 1-12.

1. Pass the tip of the drive gear spring (R) ① through the square hole of the drive gear (R) to hook the spring in position.
2. Hook one end ② of the reciprocating spring to the catch of the drive gear (R).
3. Hook the other end ③ of the reciprocating spring to the catch of the worm wheel.
4. Insert the pillar ④ of the drive gear (R) into the square hole of the worm wheel. Turn the worm wheel somewhat counterclockwise for insertion of the worm wheel to the drive gear (R), because the reciprocating spring is at work.

REPLACEMENT OF CASSETTE LOADING BELT

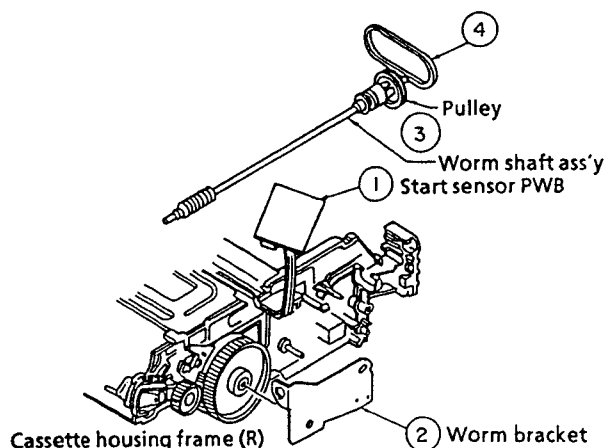


Figure 1-13.

1. Remove the start sensor PWB ① and worm bracket ② from the cassette housing frame (R).
2. Remove the worm shaft assembly ③.
3. Replace the cassette loading belt ④ with a new one.

Notes:

1. Do not overtighten the B tight screw which holds the worm bracket in position. The specified torque is $5.0 \pm 0.5 \text{ kg} \cdot \text{cm}$.
2. Make sure that the cassette loading belt is free from grease. If stained with grease, clean the belt with the cleaning liquid.
3. Perform checking of the clutch switch lever for proper action.

CHECKING THE CLUTCH SWITCH LEVER

● Checking

Place the mechanism in the cassette eject mode when removing and attaching the cassette housing from and to the mechanism chassis. Make sure enough that each part in the cassette housing such as the clutch switch lever is in position. If not, it causes malfunction.

Note:

Figure 1-14 shows the position of each part in the cassette eject mode.

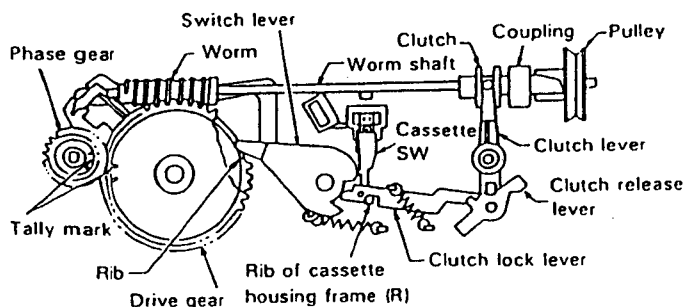
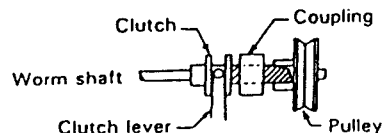


Figure 1-14.

1. First make sure that the tip of the switch lever is held at the rib of the drive gear (R).
2. Check that the rib of cassette housing frame (R) and the concavity of the clutch lock lever are engaged.
3. Finally be sure that the relationship between the clutch lever and the clutch, as well as between the clutch and the pulley, are correct as in the Figure 1-15.



Check that the clutch is engaged with the pulley through the coupling.

Figure 1-15.

● Resetting

Take the following steps to reset the clutch if it is unlocked or if the switch lever and the clutch lock lever are unlocked.

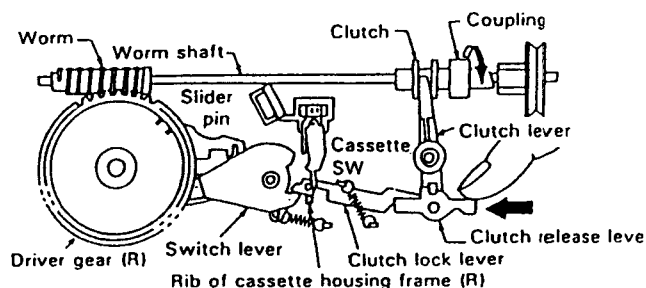


Figure 1-16.

1. Shift the slider by turning the coupling in the arrow direction (clockwise) until the slider pin is at the bottom of the slider groove as shown in the Figure 1-16. (The loading mode)

Note: Note that the slider is equipped with a lock mechanism. Unlock the locks on cassette housing frames (L) and (R) side before shifting the slider.

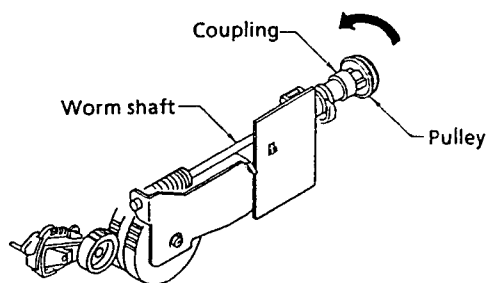
2. When the position is set as shown in the Figure 1-16, push the clutch release lever in the direction of the arrow by hand until the clutch lock lever becomes tightly locked by the rib of cassette housing frame (R).
3. Then turn the coupling counterclockwise until the slider reaches the cassette insertion opening and the reciprocating spring is activated.

Note: There is no need to unlock the slider when shifting the slider to the cassette insertion opening. Just keep shifting the slider.

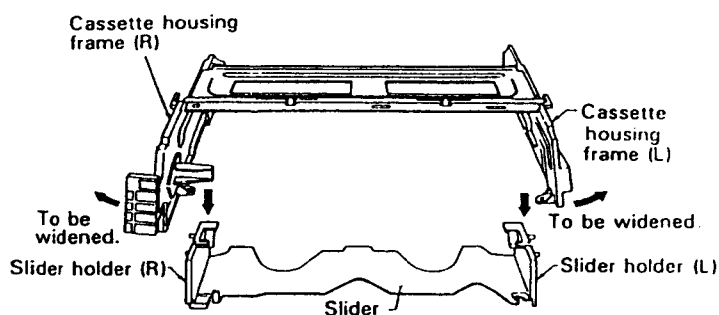
REPLACEMENT OF LOCK RELEASE LEVER ASS'Y

● Removal

1. Place the slider in the cassette down position. (Turn the coupling on the worm shaft clockwise until the slider is in the cassette down position.)
Note: Before shifting, unlock the slider.
2. Slightly widen the cassette housing frames (R) and (L) to unhook the slider holders (R) and (L) of the slider assembly off the grooves of the cassette housing frames.



(a)



(b)

Figure 1-17.

3. Lift the slider holder (R) upward about 2mm off the slider by pressing two catches with a thin tip screw driver. Take care not to damage the catches.

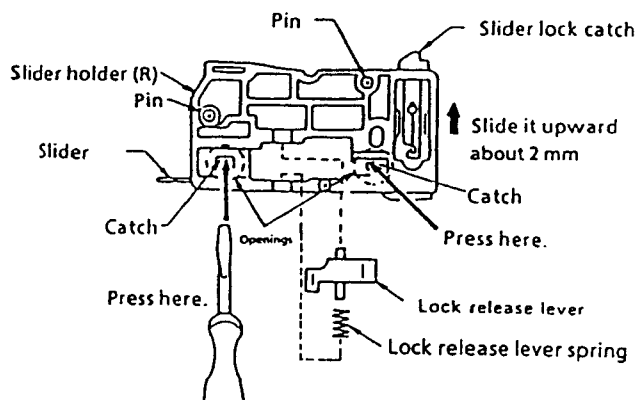


Figure 1-18.

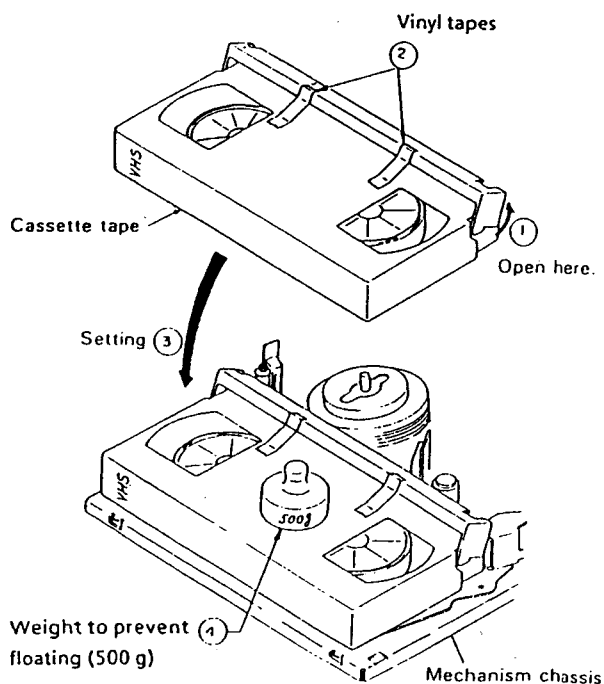
4. Remove the lock release lever from the slider holder (R).

● Reassembly

1. Follow the steps for removal in the reverse order. (See Figures 1-17 and 1-18.)
2. Attach the lock release lever to the slider holder (R).
3. Slide the slider holder (R) downward so that the two catches of the slider holder (R) fit the opening of the slider.
4. Slightly widen the cassette housing frames, and set the pins of slider holders (R) and (L) into the grooves of the cassette housing frames.
Note: Check if the pins of the slider holders (R) and (L) fit the grooves of the cassette housing frames, and if the drive gear arm is sufficiently engaged with the slider holders.
5. Turn the coupling counterclockwise until the slider is at the cassette insertion opening.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Plug in the power cord.
2. Turn on the power switch.
3. Open the lid ① of a cassette tape by hand.
4. Hold the lid with a piece of vinyl tape ②.
5. Set the cassette tape in the mechanism chassis.
6. Weight the cassette tape with a weight ④ to prevent float.
7. Perform running test.



Note: The weight should not be more than 500 g.

Figure 1-19.

REPLACEMENT AND HEIGHT CHECKING AND ADJUSTMENT OF REEL DISKS

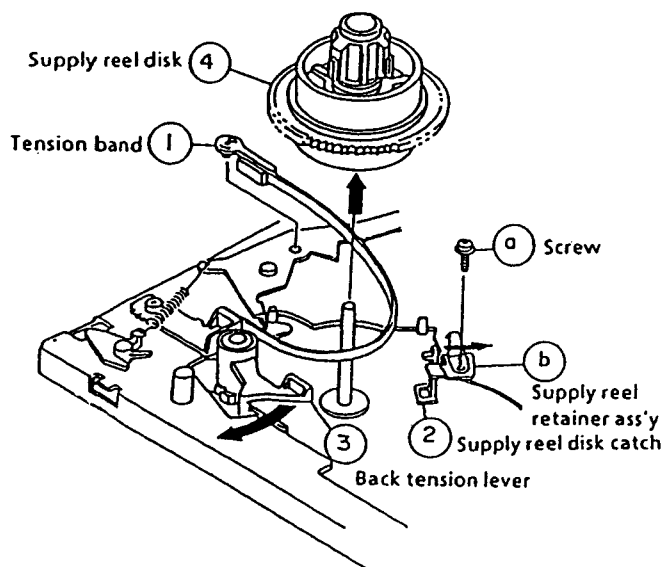
1. Remove the cassette housing control assembly.
2. Set the mechanism in the playback mode with no cassette tape in place. Unplug the power cord.
3. Set the idler gear in the center (neutral).

● Removal (Supply reel disk)

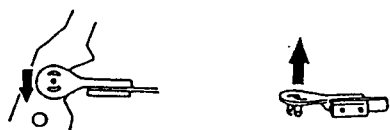
1. Remove the tension band ①. (Take care not to deform it.)
2. Unscrew the screw ② and remove the supply reel retainer assembly ③.
3. Release the supply reel disk catch and back tension lever ④.
4. Pull the supply reel disk upward.

Notes :

1. Take care not to deform the tension band.
2. Check and adjust the tension pole position. (See page 19.)
3. Be careful not to damage the gear and the idler gear on the supply reel disk.
4. Press the tension band in the direction of the arrow for removal (See Figure 1-20(b)).



(a)



(b)

Figure 1-20.

● Removal (Take-up reel disk)

1. Unscrew the screw ③ and remove the take-up reel retainer.
2. Release the take-up reel disk catch ①.
3. Pull the take-up reel disk ② upward.

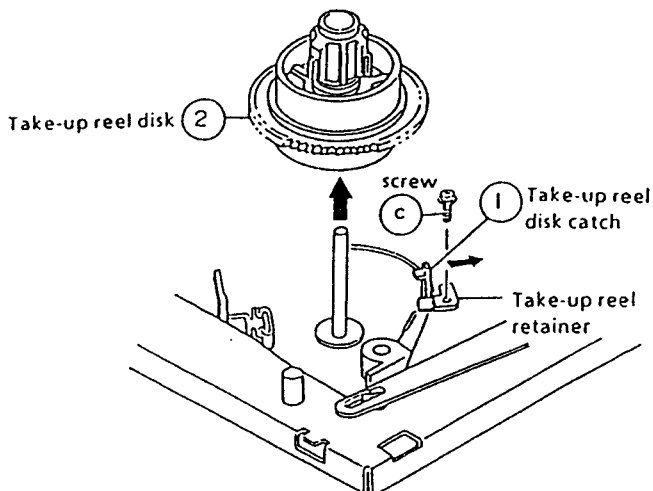


Figure 1-21.

● Reassembly (Supply reel disk)

1. Clean the reel disk shaft ① and apply oil to it.
2. Release the supply reel disk catch ② and back tension lever ③.
3. Install a new supply reel disk ④ onto the shaft.
4. Replace the tension band ⑤ around the supply reel disk, and insert it to the hole of the tension arm.
5. Replace the supply reel retainer assembly ⑥ in place, and tighten up the screw ②.

Notes :

1. Take enough care not to deform the tension band during installation of the supply reel disk.
2. Be careful not to damage the supply reel disk gear, back tension lever, catch, or the like with tools.

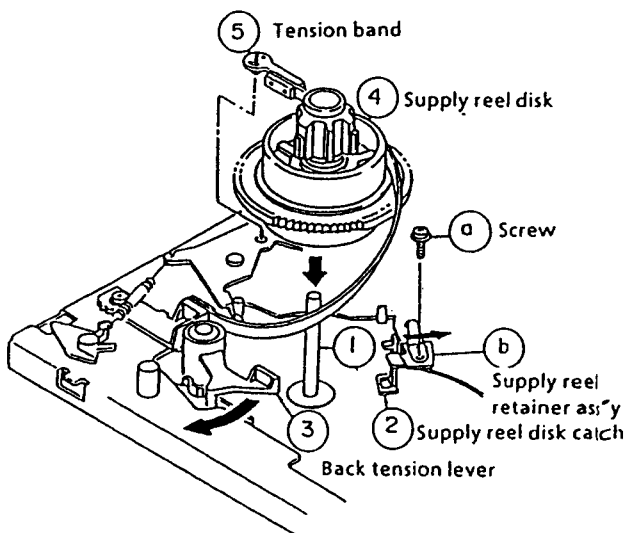


Figure 1-22.

● Reassembly (Take-up reel disk)

1. Clean the reel disk shaft ① and apply oil to it.
2. Release the take-up reel catch ② and video search brake lever ③.
3. Install a new take-up reel disk ④ onto the shaft.
4. Replace the take-up reel retainer ⑤ in position and tighten up the screw ⑥.

Note :

Take care not to damage the video search brake lever.

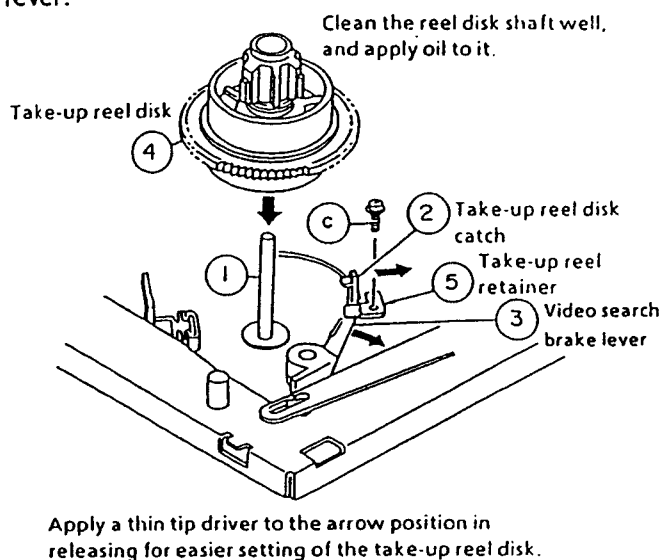


Figure 1-23.

- * After reassembly, check the video search rewind back tension (See page 18), and check the brake torque (See page 20).

● Height checking and adjustment

Note:

Place the master plane onto the mechanism unit, taking care not to hit the drum (See Figure 1-24)

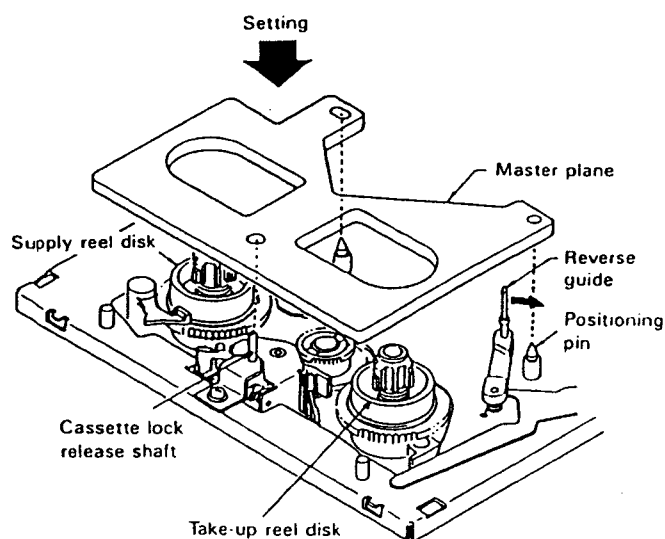


Figure 1-24.

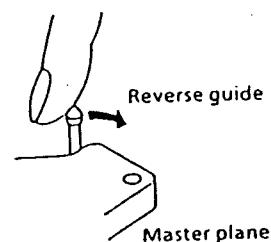
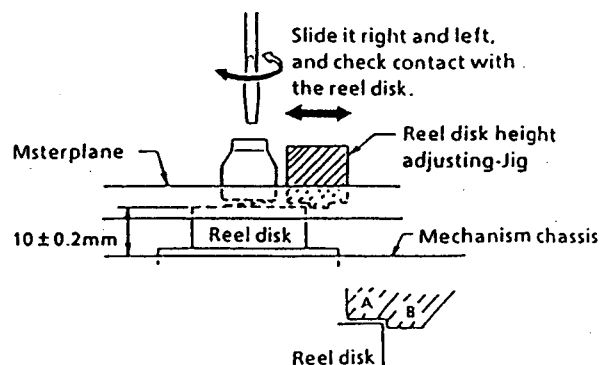
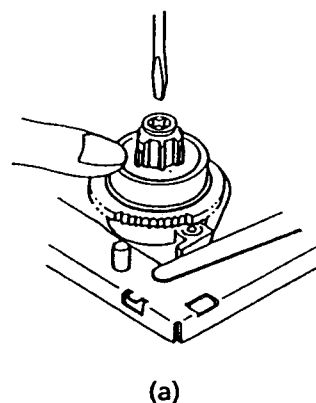


Figure 1-25.

1. For height adjustment, press the reel disk with a finger, and turn it right and left with a screwdriver (See Figure 1-26 (a)).
2. Check that the reel disk is lower than part A but higher than part B. If the height is not correct, adjust the height adjusting screw (See Figure 1-26 (b)).

Note :

Whenever replacing the reel disk, perform the height checking and adjustment.



(b)

Figure 1-26.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST FORWARD MODE

- Remove the cassette housing control assembly.
- Setting

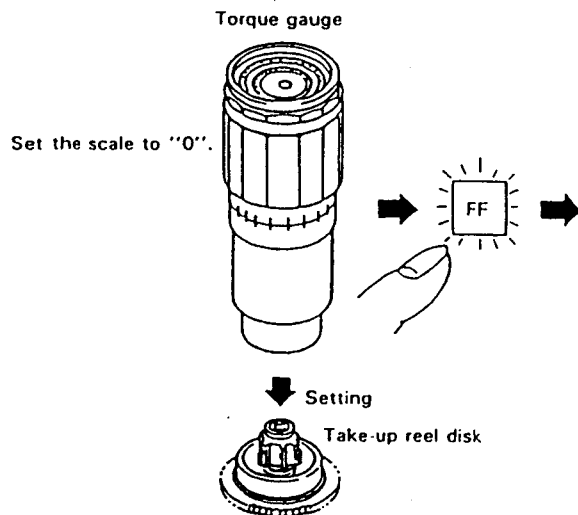


Figure 1-27.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

- Remove the cassette housing control assembly.
- Setting

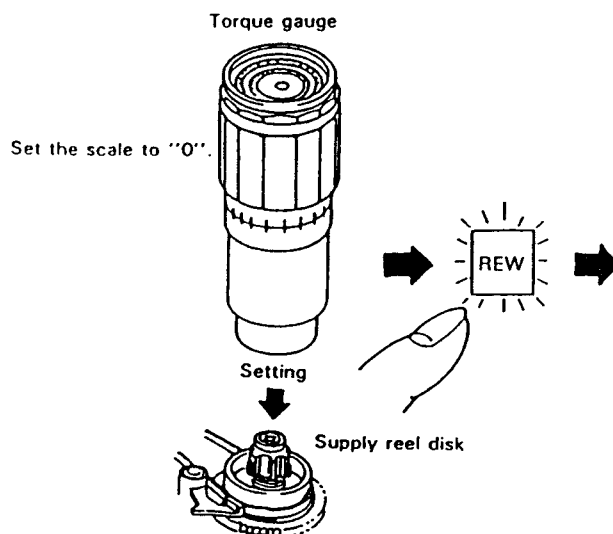


Figure 1-29.

• Checking

Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction

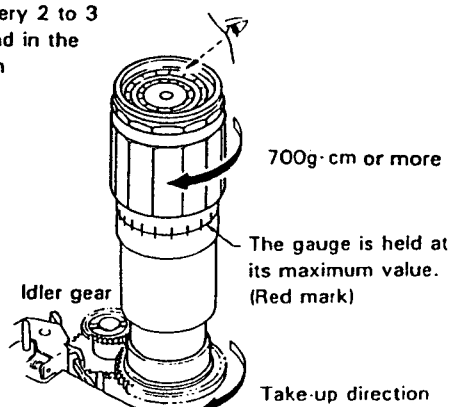


Figure 1-28.

• Adjustment

1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

Notes:

1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

• Checking

Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction

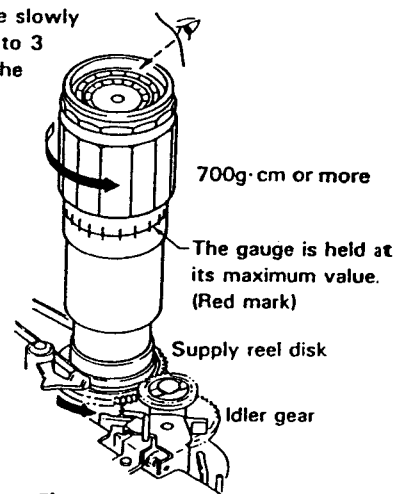


Figure 1-30.

• Adjustment

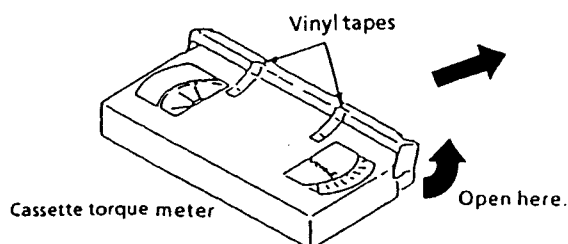
1. If the take-up torque is outside the range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
2. If the take-up torque is still out of range, replace the reel belt.

Notes:

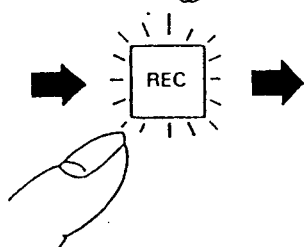
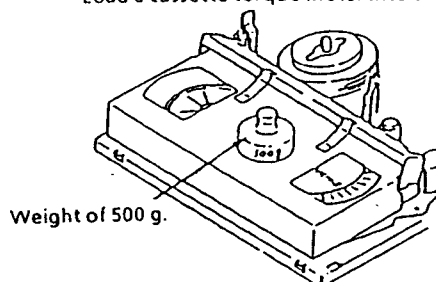
1. Hold down the torque gauge so that it may not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN PLAYBACK MODE

1. Remove the cassette housing control assembly.
2. Open the lid of the cassette torque meter, and hold it with a piece of vinyl tape.



Load a cassette torque meter into the unit.



Set value LP 95 ± 30 g.cm

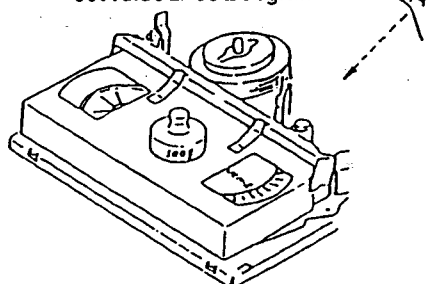


Figure 1-31.

● Checking

1. Check that the torque is in the range of 95 ± 30 g.cm.
2. The torque fluctuates due to the rotational deviation of the reel drive unit. Use the center of the fluctuation as the value.
3. Place the unit in the LP record mode, and check that the take-up torque is within the range.

● Adjustment

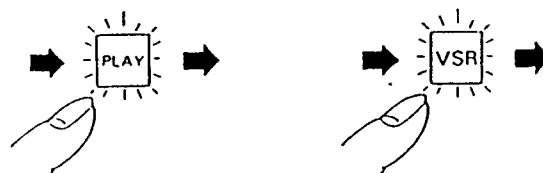
If the take-up torque in the playback mode is outside the range, replace the take-up reel disk.

Note :

Weight the cassette torque meter to prevent floating.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

- Remove the cassette housing control assembly.
- Checking



Push the play button to place the unit in the playback mode. Push the video search rewind button to place the unit in the video search rewind mode.

Place the torque gauge on the supply reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within the set value 170 ± 40 g.cm.

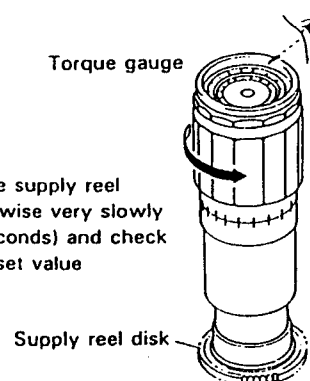


Figure 1-32.

Note:

Set the torque gauge securely on the supply reel disk. If it is not secure, the measurement will be incorrect.

● Adjustment

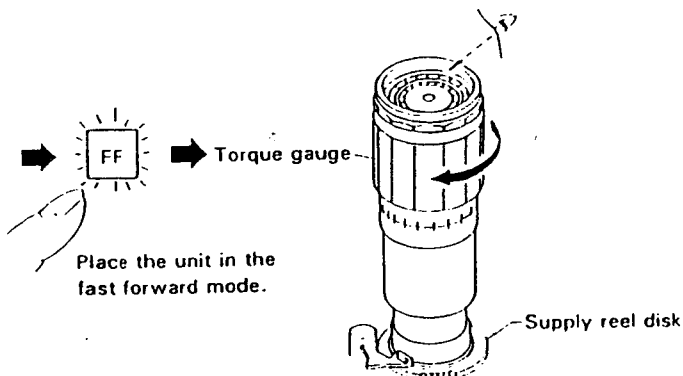
If the take-up torque in video search rewind mode is outside the range, replace the supply reel disk.

Note :

The torque fluctuates due to the rotational deviation of the supply reel disk. Use the center of the fluctuation at the value.

CHECKING THE FAST FORWARD BACK TENSION

- Remove the cassette housing control assembly.
- Checking



Place the torque gauge on the supply reel disk, and turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 15 ± 5 g·cm

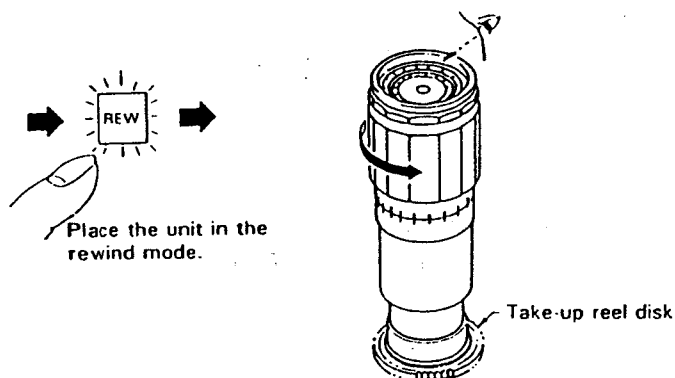
Figure 1-33.

Note:

Set the torque gauge securely on the supply reel disk. If the torque gauge is not securely set on the reel disk, measurement will be incorrect.

CHECKING THE REWIND BACK TENSION

- Remove the cassette housing control assembly.
- Checking



Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 15 ± 5 g·cm.

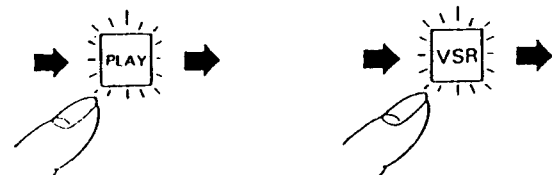
Figure 1-34.

Note:

Set the torque gauge securely on the take-up reeldisk. If it is not secure, the measurement will be incorrect.

CHECKING THE VIDEO SEARCH REWIND BACK TENSION

- Remove the cassette housing control assembly.
- Checking



Push the play button to place the unit in the playback mode. Push the video search rewind button to place the unit in the video search rewind mode.

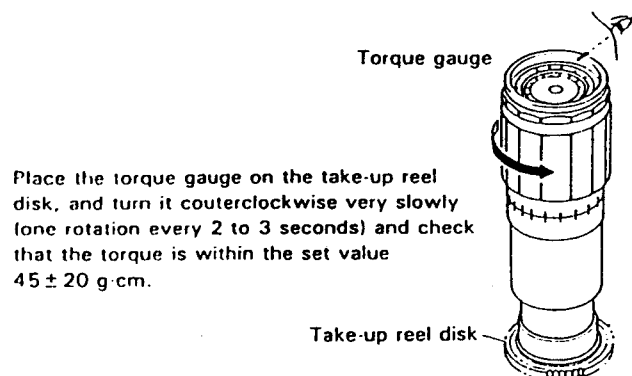


Figure 1-35.

Note:

Set the torque gauge securely on the take-up reeldisk. If it is not secure, the measurement will be incorrect.

CHECKING THE PINCH ROLLER PRESSURE

- Remove the cassette housing control assembly.

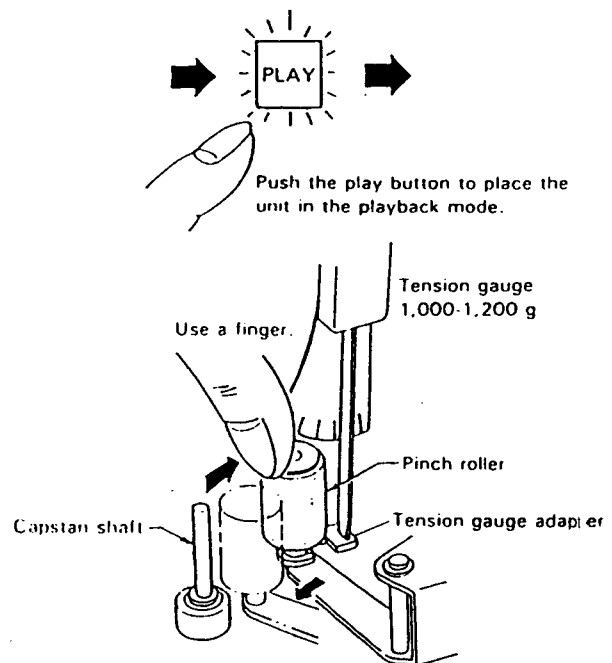
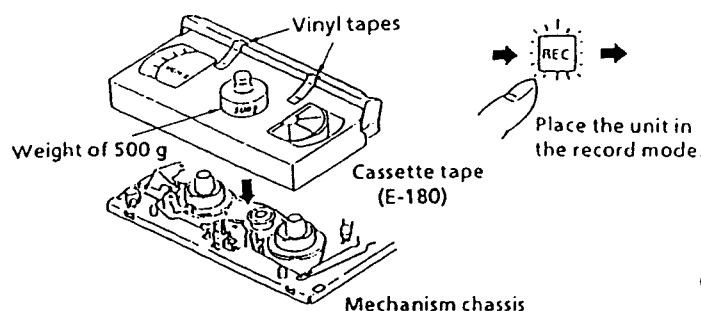


Figure 1-36.

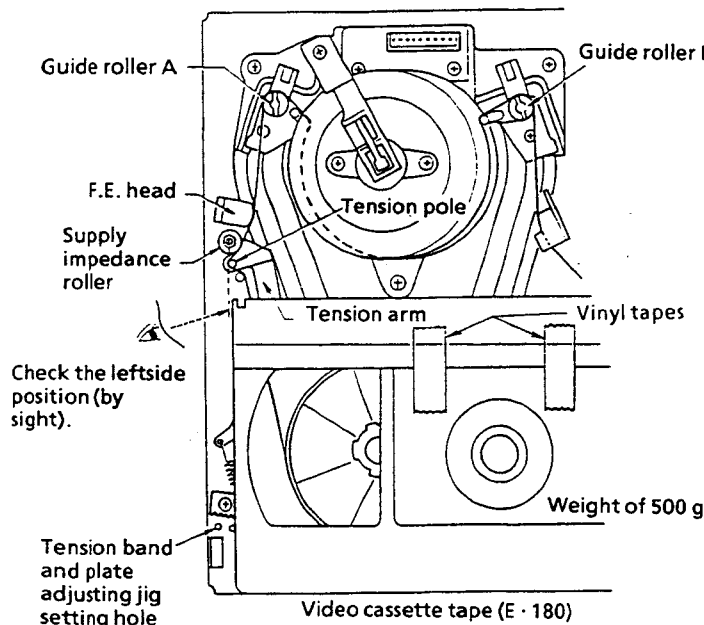
1. Detach the pinch roller from the capstan shaft.
2. Set the tension gauge by hooking the tension gauge adapter onto the pinch roller shaft.
3. Gradually release the pressure to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
4. Check that the reading of the tension gauge is in the range of 1000 to 1200 g.

CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

- Remove the cassette housing control assembly.
- Setting



(a)



(b)

Figure 1-37.

• Checking

1. The guide rollers (A, B) operate to bring the tape outside the cassette tape and simultaneously the tension pole moves to the left, loading the tape. At that time (loading completed), check the position of the tension pole.

2. At the beginning of the tape (E-180), check that the tension pole's left side is aligned with the supply impedance roller's center by sight.
3. Check that the end of the tape is neither curled against the flange of the supply impedance roller nor over it.
4. During the video search rewind mode with no cassette tape in place, check that the supply reel disk is free from the tension band.

• Position adjustment (record mode)

When the tension pole is at the right of the supply impedance roller's center:

Untighten the tightening screw, and shift the tension band adjustment bracket in the direction of the arrow using a tension band and plate adjusting jig until it is in the set value range (center). Then secure it with the tightening screw.

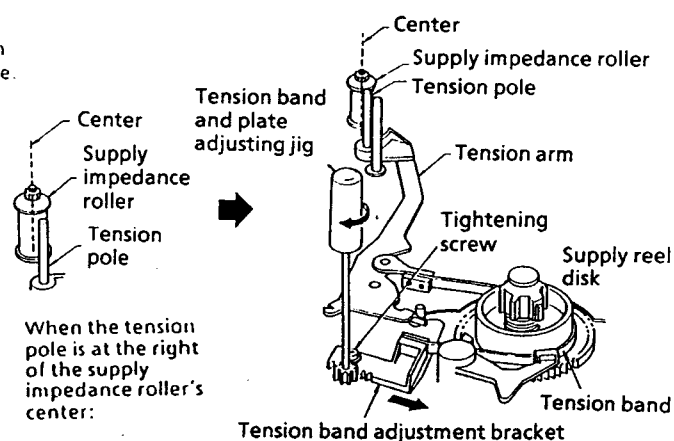


Figure 1-38.

• Position adjustment (record mode)

When the tension pole is at the left of the supply impedance roller's center:

Untighten the tightening screw, and shift the tension band adjustment bracket in the direction of the arrow using a tension band and plate adjusting jig until it is in the set value range (center). Then secure it with the tightening screw.

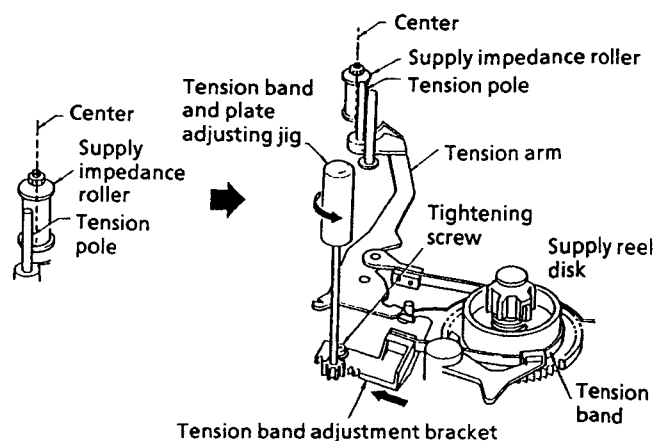


Figure 1-39.

CHECKING AND ADJUSTMENT OF RECORD / PLAYBACK BACK TENSION

A. When using a cassette torque meter:

- Remove the cassette housing control assembly.

● Checking

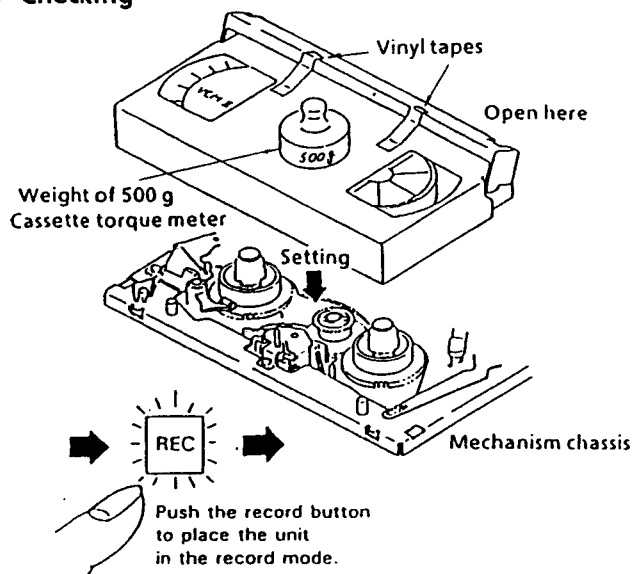


Figure 1-40.

1. Put a cassette torque meter into the unit.
2. Push the record button to place the unit in the record mode.
3. Check that the back tension indicated by the gauge is within the set range 31 to 36 g.cm.

Notes :

1. Make sure that the video cassette tape is over the retaining guide.
2. Make sure that the tape is not slack nor damaged at either end.

● Adjustment

1. If the reading of the cassette torque meter is less than specified, move the tip of the tension spring hook plate toward the hole A.
 2. If the reading of the cassette torque meter is more than specified, move the tip of the tension spring hook plate toward the hole B.
- * Put a thin screw driver (-) in the shaft hole, lean it toward you, and turn it for easier shift of the tension spring hook plate in the direction of A or B.

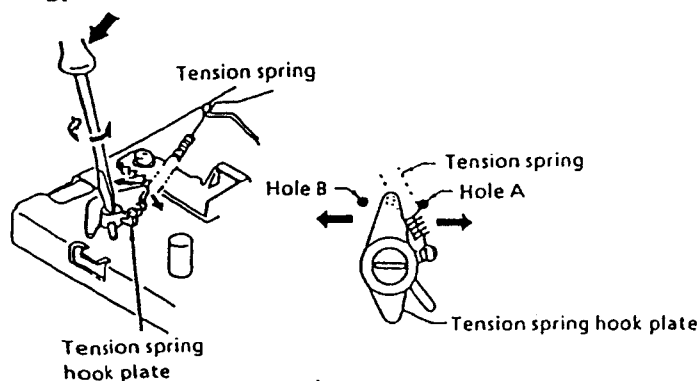


Figure 1-41.

Figure 1-42. Not used.

CHECKING THE BRAKE TORQUE

- Checking the brake torque at the supply side

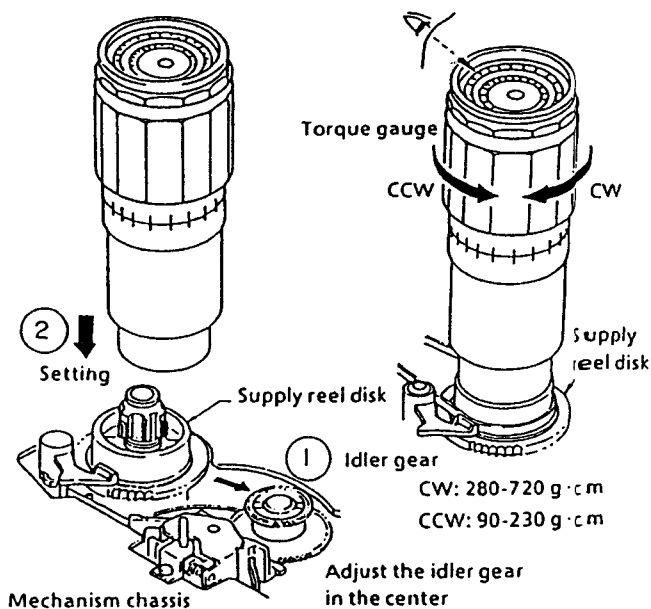


Figure 1-43.

1. Remove the cassette housing control assembly.
2. Place the mechanism in the stop mode by unplugging the power cord in the fast forward or rewind mode.
3. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the supply brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CW direction = 280 to 720 g. cm, CCW direction = 90 to 230 g.cm, and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

● Checking the brake torque at the take-up side

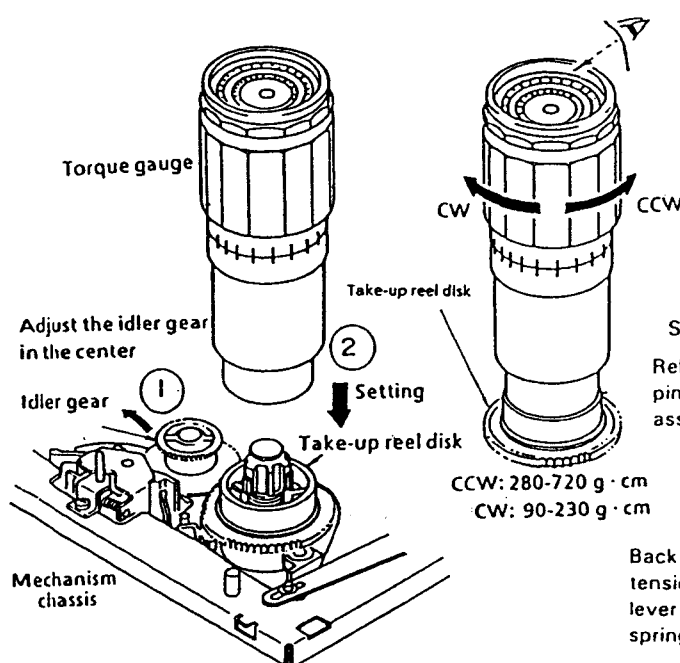


Figure 1-44.

1. Remove the cassette housing control assembly.
2. Slowly rotate the torque gauge in the clockwise (CW) direction and counterclockwise (CCW) direction of the take-up brake so that the reel disk and the indicator of the torque gauge rotate at an equal rate. Check that the values are within the range of CCW direction = 280 to 720 g. cm, CW direction = 90 to 230 g.cm, and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

● Adjustment of the brake torque at the supply side and the take-up side

1. If the supply or take-up brake torque is outside the range, clean the supply or take-up reel disk break lever felt, then recheck the torque.
2. If the supply or take-up brake torque is still outside the range, replace the main brake or the main brake spring.

REPLACEMENT OF MAIN BRAKE

1. Remove the reel belt and the reel block FFC. (Full Flat Cable)
2. Remove the cut washer ① off the brake shifter.
3. Unscrew the four screws ② and then the take-up reel retainer.
4. Remove the reel block assembly ④ downward.
5. Remove the cut washer ③ first and then the reel pulley.
6. Unscrew the two screws ④ and detach the idler assembly.
7. Unhook the back tension lever spring ⑤ and remove the back tension lever ⑥. (Undo the hook under the reel chassis.)
8. Open the shifter latch ⑦ and remove the brake shifter assembly ⑧.
9. Release the reel disk catches ⑨ and then remove the left and right reel disk assemblies ⑩ and ⑪.
10. Finally remove the main brake levers ⑫ and the main brake spring ⑬.

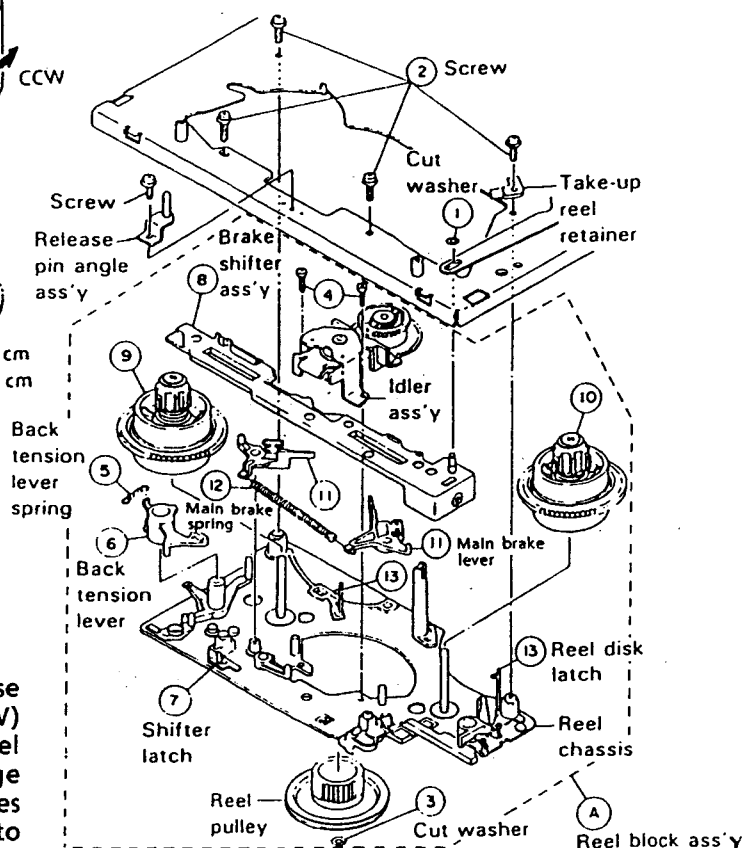


Figure 1-45.

Note :

When the main brake is replaced, perform the height checking and adjustment (See page 14), and the brake torque checking (See page 20).

REPLACEMENT OF A/C (Audio/Control) HEAD

1. Remove the cassette housing control assembly.
2. Place the unit in the unloading mode, and unplug the power cord.

● Removal

1. Loosen the tilt adjusting screw ①.
2. Remove the azimuth adjusting screw ②.
3. Remove the A/C head screw ③.
4. Unsolder the A/C head PWB soldered to the A/C head assembly.

Note :

1. After replacement, be sure to perform the adjustment of the tape drive train (See page 24). Under any circumstances, avoid touching the head. Clean the head, if touched with your finger, with alcohol.
2. Take care that the azimuth spring does not fly off when removing the A/C head screw.

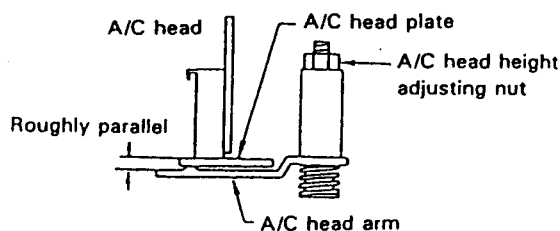


Figure 1-48.

● Adjustment

[A/C head tilt angle]

1. Set the mechanism to the loading mode.
2. Place the A/C head tilt adjusting jig ①.
3. Slowly turn the tilt adjusting screw ② with a screw driver until there is no gap between the jig and the A/C head.

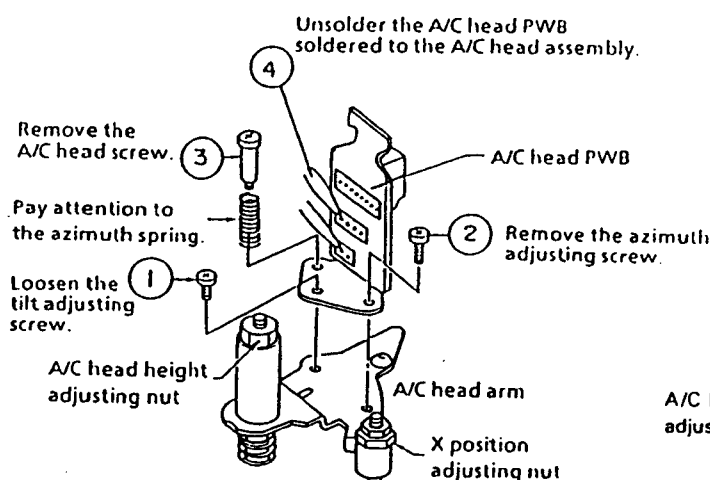


Figure 1-46.

● Replacement

1. Solder the removed A/C head PWB onto a new A/C head assembly.
2. The A/C head assembly is attached so that the A/C head arm and A/C head plate are roughly parallel to each other.

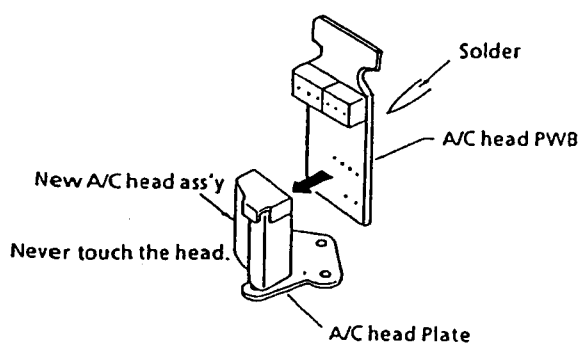
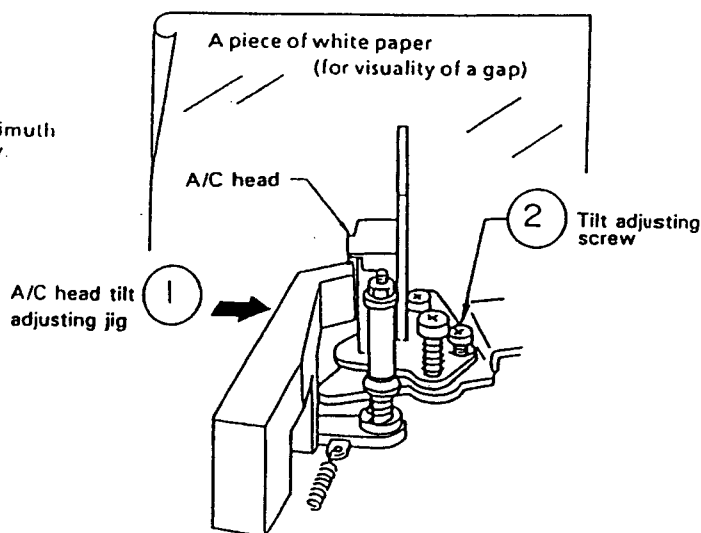
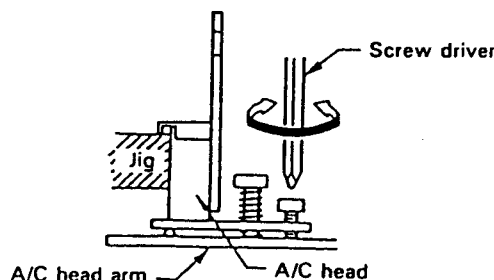


Figure 1-47.



(a)



(b)

Figure 1-49.

[A/C head height rough adjustment]

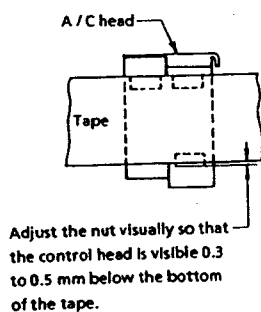
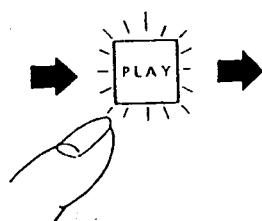
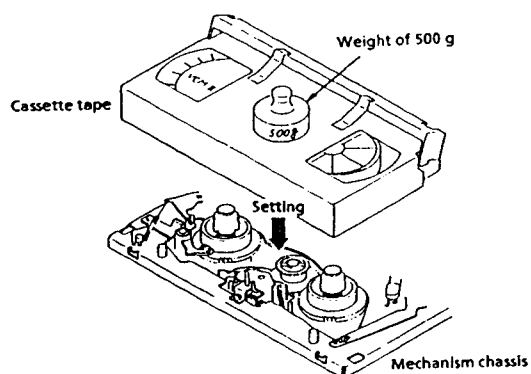
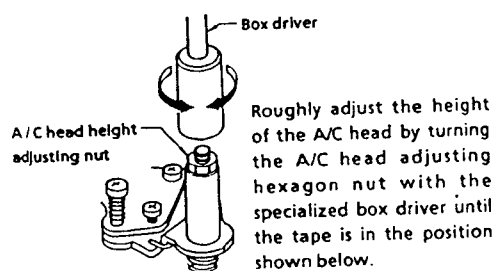


Figure 1-50.

HEIGHT ADJUSTMENT OF RETAINING GUIDE AND REVERSE GUIDE

Note :

Before the rough adjustment of the tape drive train, check that the retaining guide height is within the value in Figure 1-51 by using the special jigs.

[Height adjustment of retaining guide]

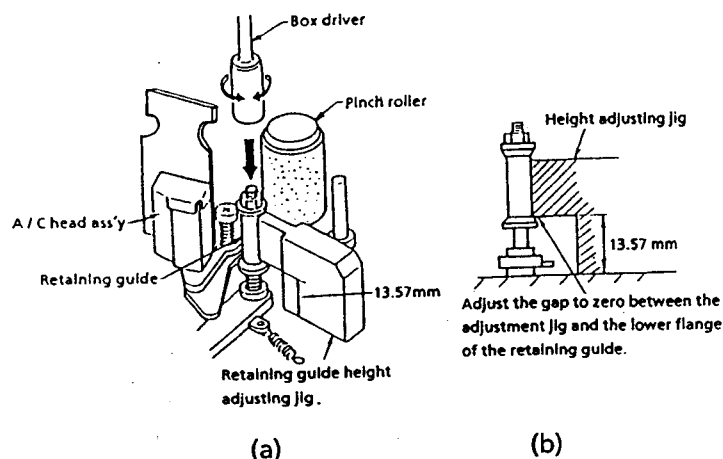
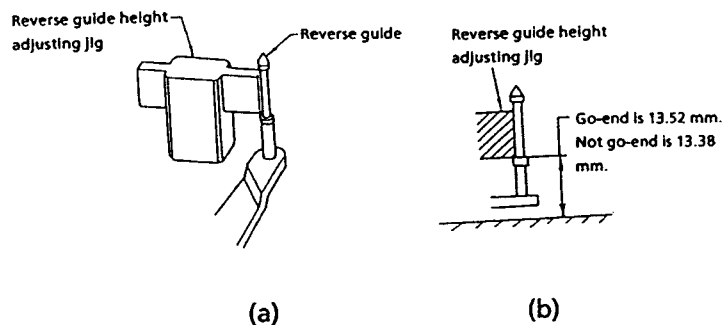


Figure 1-51.

[Height adjustment of reverse guide]



To readjust the height, remove the cut washer from behind, take out the spring, lift the reverse guide and add a washer.

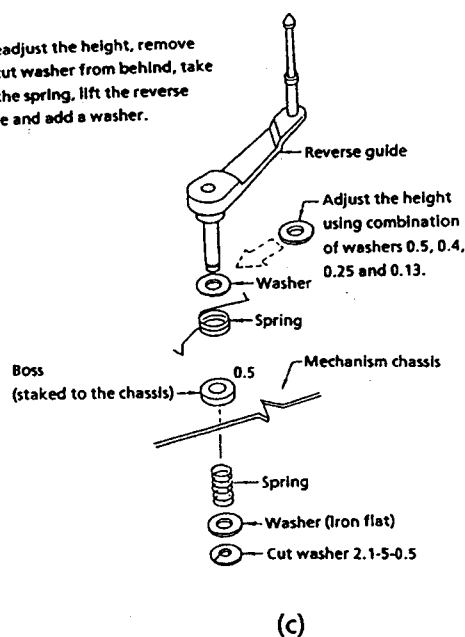


Figure 1-52.

ADJUSTMENT OF TAPE DRIVE TRAIN

1. Remove the cassette housing control assembly.
2. Check and adjust the position of the tension pole. (See page 19.)
3. Check and adjust the video search rewind back tension. (See page 18.)
4. Set the tilt angle of the A/C head. (See page 22.)
5. Rough adjustment of tape drive train.
 - a) Connect the oscilloscope to the test point for PB CHROMA envelope output (TP501). Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP502).
 - b) Loosen the setscrew at the lower part of the guide roller, and adjust it with an adjusting screw driver (JIGDRIVERH-4) so that the guide roller turns smoothly. (Do not overloosen the setscrew, which causes insecurity of the guide roller.) (See Figure 1-53.)
 - c) Set the alignment tape (monoscope pattern) on the reel disk, and place the unit in the playback mode. (Place a 500 g. weight on the cassette tape to prevent floating of the cassette tape.)

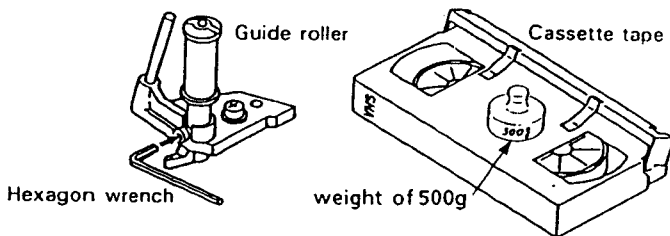


Figure 1-53.

Figure 1-54.

- d) Change the envelope waveform from MAX to MIN, and MIN to MAX by pushing the (+) or (-) tracking button, and check a flat response is obtained on the waveform.
- e) If a flat response cannot be obtained, roughly adjust the guide rollers on the supply side and take-up side using an adjusting screw driver until a flat response can be obtained.
- f) Turn the A/C head tilt adjusting screw with a screwdriver to prevent the tape from wrinkling at the upper and lower flanges of the fixed guide.
 - 1) Wrinkles at the upper flange : Turn the above adjusting screw clockwise, as shown in Figure. 1-55 (a)
 - 2) Wrinkles at the lower flange : Turn the above adjusting screw counterclockwise, as shown in Figure. 1-55 (b)

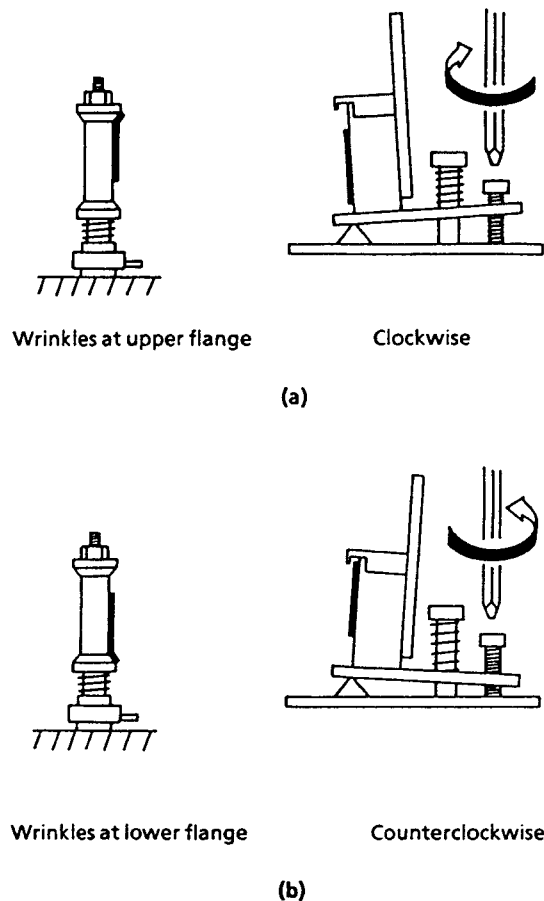


Figure 1-55.

Notes:

1. Place the tracking control in the center position, and adjust the X-position adjusting nut so that the PB CHROMA envelope becomes maximum for easier rough adjustment of the tape drive train.
2. In the rough adjustment, pay particular attention to the outlet side.



Figure 1-56.

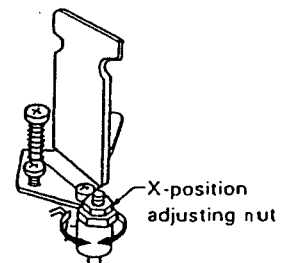


Figure 1-57.

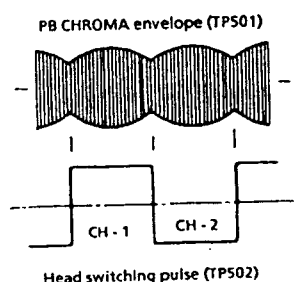


Figure 1-58.

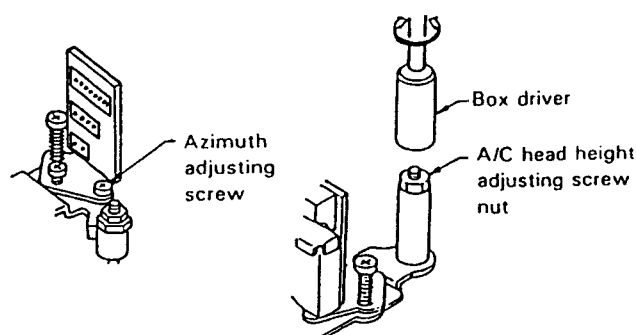


Figure 1-59.

Figure 1-60.

6. Adjustment of A/C head height and azimuth

- Connect an oscilloscope to the audio output terminal.
- Use the alignment tape and play back its audio 6 kHz signal (monoscope pattern for video signal). Adjust the azimuth adjusting screw to obtain the maximum audio output on an oscilloscope. (See Figure 1-59.)
- Use the alignment tape and play back its audio 1 kHz signal (colour bar for video signal) and slowly rotate the A/C head height adjusting nut with the special box driver to obtain the maximum audio output.
- Perform the adjustment in b) again.
- After this adjustment, apply glyptal to the screws and nuts to fix them.

7. Adjustment of tape drive train and X-Position.

- Connect the oscilloscope to the test points (TP501) for PB CHROMA envelope output. Set the synchronism of the oscilloscope to EXT. The PB CHROMA signal is to be triggered by the head switching pulse (TP502).
- Play back the tape drive train alignment tape.
- Push the (+) or (-) button to change the envelope waveform from MAX to MIN, and MIN to MAX. Adjust the guide roller's height on the supply and take-up sides with an adjusting screw driver, to obtain an envelop waveform that is as flat as possible.
- If the tape is above or below the helical lead, the PB CHROMA waveform will take the shape shown in Figure 1-61.
- Adjust for maximum flatness of the envelope as the step 5, e) in page 24.

	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to make the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 1-61.

- f) Push the (+) or (-) tracking button to check that a flat response is obtained on the envelope waveform.
 - g) Secure the guide roller by tightening the guide roller setscrew in the unloading mode.
 - h) Play back the tape drive train alignment tape to check that the envelope waveform does not change.
8. Adjustment of A/C head X-position.
- a) Push the (+) and (-) tracking buttons at the same time to the preset mode.
 - b) Rotate the X-position adjusting nut with an adjusting box driver, and adjust the A/C head position for maximum head switching pulse low side envelope.
 - c) Adjust the playback switching point.
 - d) Check the flatness of the envelope waveform and sound by playing back a recorded tape.

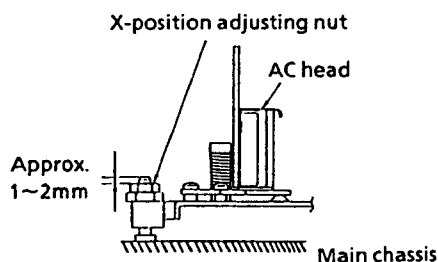


Figure 1-62.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- Remove the cassette housing control assembly.
- Removal (Follow the order of indicated numbers.)

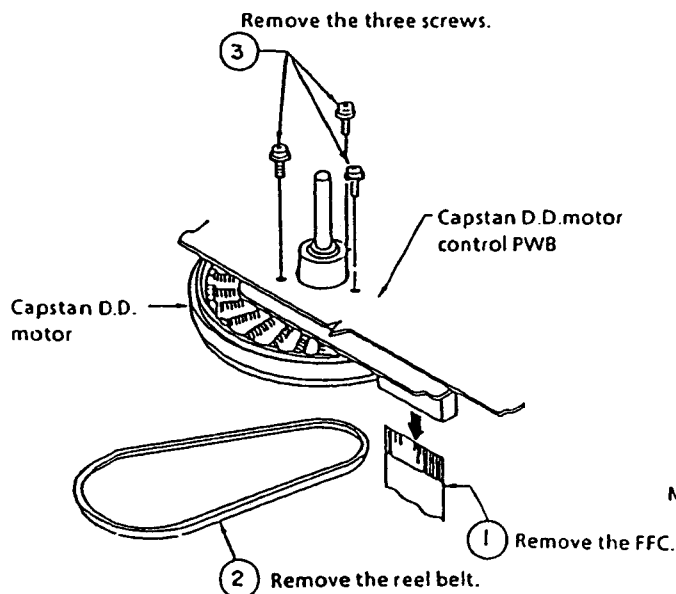


Figure 1-63.

Reassembly

1. Mount the capstan motor on the mechanism chassis making sure not to allow the capstan shaft to hit the mechanism chassis, and attach it with the three screws.
2. Insert the FFC into the capstan D.D. motor control PWB.
3. Attach the reel belt.

Notes :

1. After installing the capstan D.D. motor, be sure to rotate the capstan D.D. motor and check the movement.
2. Check and adjust the servo circuit.

REMOVAL AND REASSEMBLY OF THE LOADING GEAR BLOCK

Notes : The following explanation is based on 4-head models. (The slow brake spring and slow brake lever are not provided on 2-head models.)

1. Remove the cassette housing control assembly.
2. Remove the reel belt.
3. Remove the reel block.

Removal

Notes :

1. Use care not to deform the parts hooked to the slow brake shaft cap, take-up loading gear, and supply loading gear as shown in Figure 1-64.

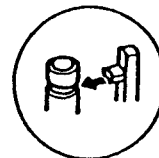


Figure 1-64.

2. In removing the loading gear, secure the guide roller with a rubber band or the like beforehand for easier reassembly.

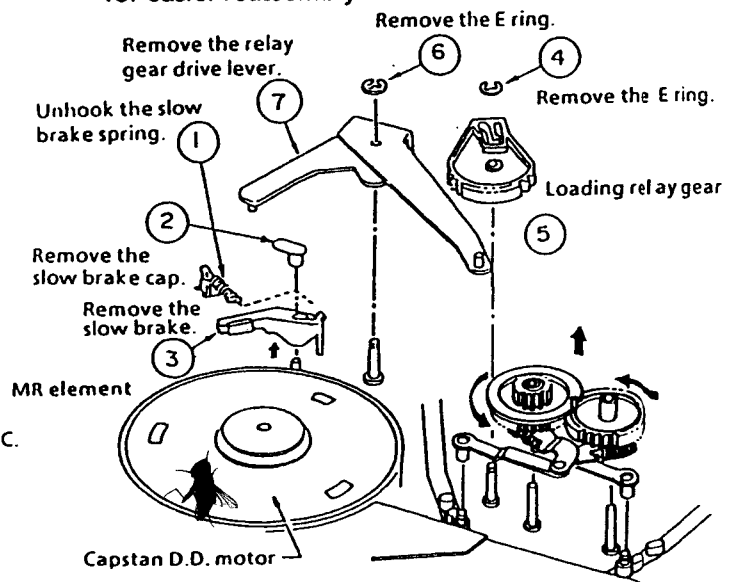


Figure 1-65.

1. Remove the slow brake spring ①.
2. Remove the slow brake shaft cap ②.
3. Remove the slow brake lever ③.
4. Remove the E ring ④.
5. Rotate the take-up loading gear, take-up loading arm assembly, supply loading gear and supply loading arm assembly slightly in the loading direction, and take them ⑤ all out.
6. Remove the E ring ⑥.
7. Remove the relay gear drive lever ⑦.

● Reassembly

Reverse the procedure. Be sure to match the tally marks on the gears.

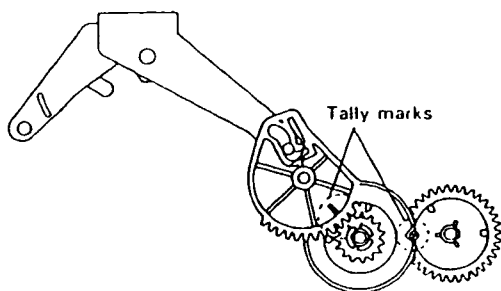


Figure 1-66.

Notes :

1. When reassembling, apply specified grease to the following points; all the gear teeth, all the gear shafts and the cam groove of loading relay gear.
2. Be careful not to deform the supply/take-up loading arms.
3. Be careful to keep clean the slow brake lever felt.
4. Be also careful to keep the outer surface of the capstan D.D. motor free from dust and dirt. (If stained, the MR (Magnet Resistor) element might be damaged.)
5. Take care not to deform the anti-fall hooks of the slow brake lever, slow brake shaft cap and supply/ take-up lading gears more than required.

REMOVAL AND REASSEMBLY OF LOADING BLOCK

● Removal

1. Remove the leads ①.
2. Remove the cassette loading belt ②.
3. Unscrew the three screws ③.
4. Pull the loading block upward.

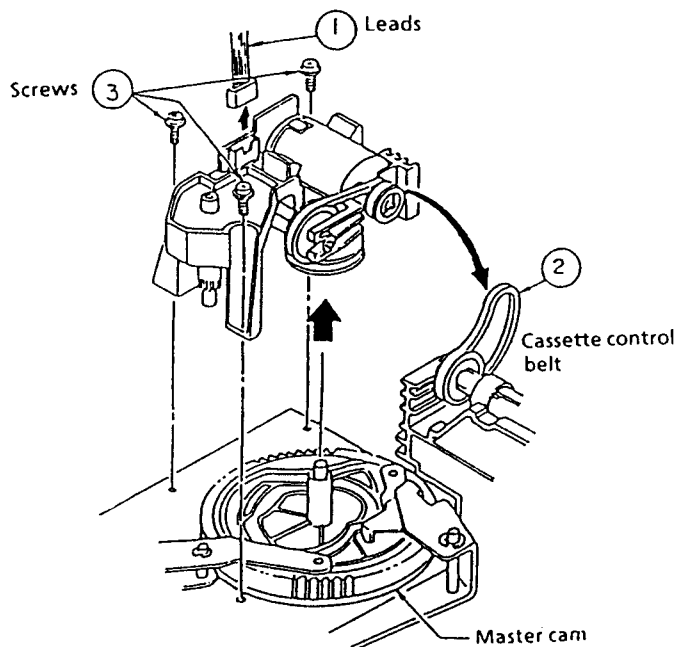


Figure 1-67.

Note :

When using a magnetic screw driver in removal of three screws, do not allow the magnetic driver to hit the A/C head or drums.

● Reassembly

1. Turn the master cam all the way counterclockwise.
2. Match the tally mark on the cam switch with the mating mark. Fit the loading block and the master cam with each other. Tighten up the three screws.

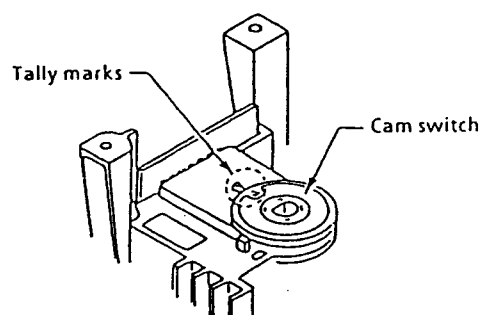


Figure 1-68.

3. Finally connect the leads and apply the cassette loading belt.

Notes:

1. Be careful not to scratch the gear.
2. Be careful not to stain the belt. If dirty, clean it up with the specified cleaning liquid.

REPLACEMENT OF LOADING MOTOR

1. Set the cassette ejected condition by placing the unit in the cassette eject mode.
2. Unplug the power cord.
3. Remove the loading block in accordance with the statements and drawings above.

● Removal

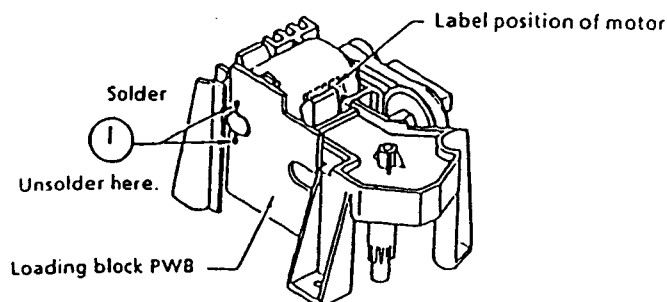


Figure 1-69.

1. Unsolder the leads ① from the loading motor.
2. Unlock the left and right catches ② of the cam switch and loading block PWB. Take out the cam switch and loading block PWB (See Figure 1-70).

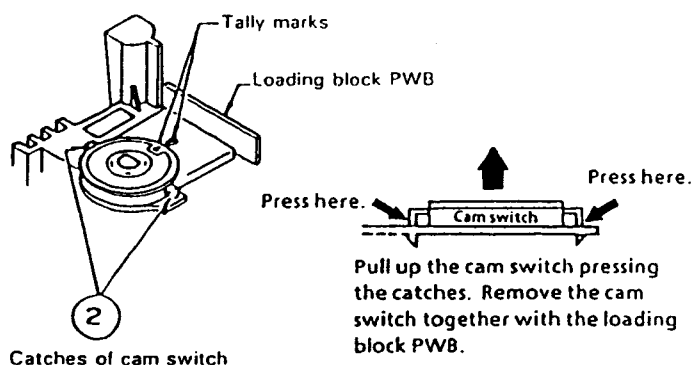


Figure 1-70.

3. Take out the loading belt ③.
4. Pry up the back end of the loading motor with a screwdriver or the like as in Figure 1-71 and take out the motor.

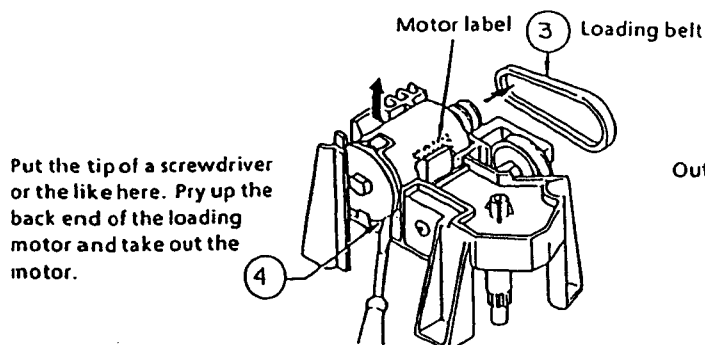
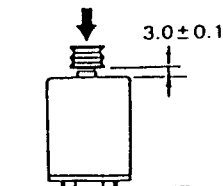
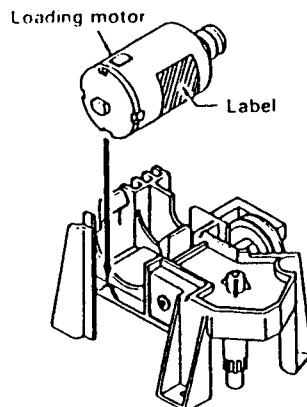


Figure 1-71.

● Reassembly

1. Remove the loading motor, and mount a new loading motor as in Figure 1-72.
2. Place the loading motor so that its label is visible as shown in Figure 1-72. Make sure that the screw hole at the motor shaft, protuberance on the loading block, and the motor's back end marked with the arrow are mated with each other.



Note:
When press-fitting the loading motor pulley, keep the pressure less than 5 kg, and the gap between the motor and pulley should be 3.0 ± 0.1 mm.

Figure 1-72.

Figure 1-73.

3. Set the lading block PWB and the cam switch in position.
4. Resolder the leads to the loading motor.
5. Finally place the loading block (See page 27).
6. Attach the loading belt.

REPLACEMENT OF MASTER CAM

● Removal

1. Remove the E ring ①.
2. Remove the half loading drive lever ②.
3. Remove the E ring ③.
4. Remove the pinch roller lever ④.
5. Pull out the master cam ⑤ upward.

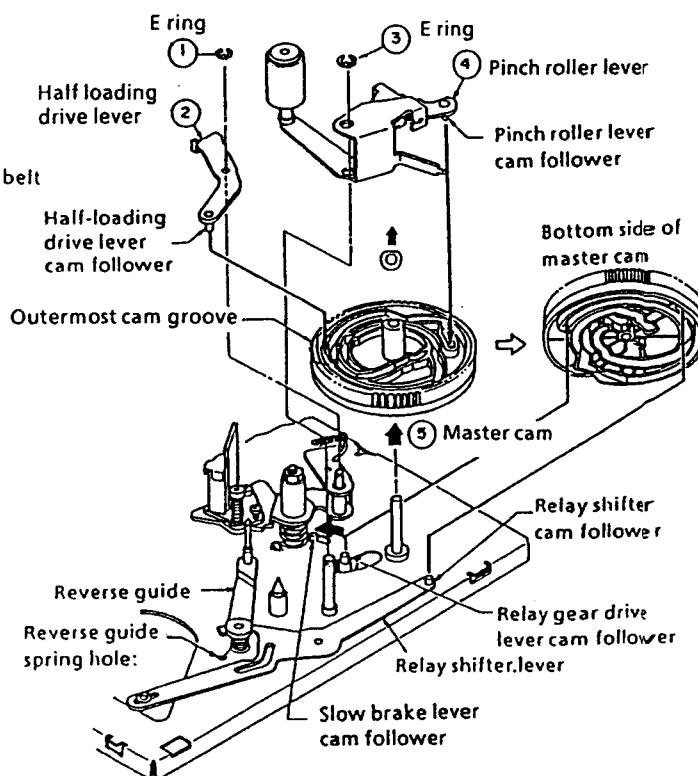


Figure 1-74.

● Reassembly

1. Place the relay gear drive lever in the unloading state.
2. Place the relay shifter so that it is in contact with the reverse guide spring hole in the mechanism chassis. Release the slow brake lever with a finger to bring it away from the capstan (in the direction of arrow). Then place the master cam so that the D cut-off part of the master cam faces the direction of arrow.
3. Place the half loading reciprocating lever's cam follower so that it fits in the master cam's circumferential cam groove (marked with arrow), attach the E ring, then mount the half-loading reciprocating lever.
4. Turn the master cam somewhat clockwise until the pinch roller lever's cam follower goes into the master cam's groove (marked with arrow). Mount the pinch roller level and then attach the E ring.
5. Rotate the master cam by hand to make sure all the four levers (relay gear drive lever, half loading reciprocating lever, pinch roller lever, and relay shifter lever) are in the cam grooves in place.
6. Mount the loading block. (See page 27.)

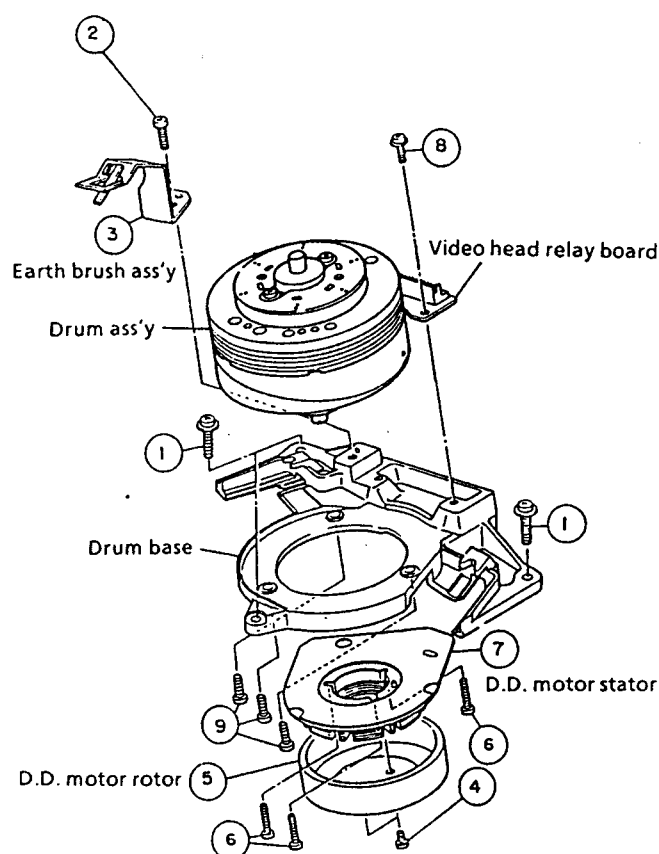
Notes :

1. Be careful not to scratch the teeth and grooves of the master cam.
2. After installation of the master cam, be sure to rotate the master cam by hand before installing the loading block. If the levers are in wrong position, the master cam and the levers may get damaged when the motor starts.
3. Apply specified grease to the master cam's grooves and teeth.

REPLACEMENT OF DRUM ASSEMBLY

● Removal

1. Remove the head amp. PWB from the video head relay board.
2. Remove the bottom board (Ref. No ④ in the Cabinet Parts Diagram).
3. Remove the D.D. drum motor connector (ME).
4. Loosen the Drum-base mounting screws ① and remove the drum ass'y from the mechanism chassis.
5. Loosen the Earth brush ass'y mounting screw ② and remove the Earth brush ass'y ③.
6. Loosen the two D.D. motor rotor mounting screws ④ and remove the D.D. motor rotor ⑤.
7. Loosen the three D.D. motor stator mounting screws ⑥ and remove the stator ⑦.
8. Remove the two video head relay board mounting screws ⑧.
9. Loosen the three drum ass'y mounting screws ⑨ and remove the drum ass'y from the Drum-base.



Note:

Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and lower drum match.

Figure 1-75.

● Reassembly

1. Set the new drum.
2. Place the relay PWB as shown in the figure and solder it securely.

Notes:

- 1) Before setting the drum, make sure that there is no scratches or dust on the end surface and circumference of the disk.
- 2) Before setting the drum, make sure that there is no scratches or dust on the internal surface and end surface of the upper drum.
- 3) Install the upper drum onto the disk with such care that the upper drum is not tilted.
- 4) When reassembling these parts, do not allow dust and dirt to come between the disk and the upper drum.
- 5) Do not use excessive force when driving in the screws.
1. Fasten the upper drum in place with the two setscrews.
2. Solder the leads quickly and carefully without touching adjacent patterns.
3. Finally be sure to check the tape drive train adjustment and the following electrical adjustments.
 - * Adjustment of the playback switching point
 - * Checking and adjustment of the X-position
 - * Adjustment of SP and EP slow tracking preset

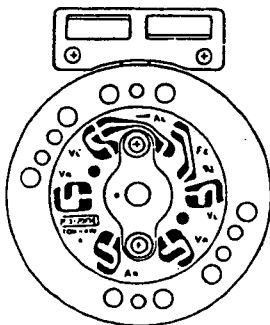


Figure 1-76.

REPLACEMENT OF D.D. MOTOR

1. Put the unit in the eject mode.
2. Unplug the power cord from the wall socket.

* Removal (Follow the order of the indicated numbers.)
(Reverse the order in reassembly.)

1. Remove the FFC.
2. Remove the D.D. rotor assembly setscrews.
3. Pull out the D.D. rotor assembly.
4. Remove the D.D. stator assembly setscrews.
5. Pull out the D.D. stator assembly.

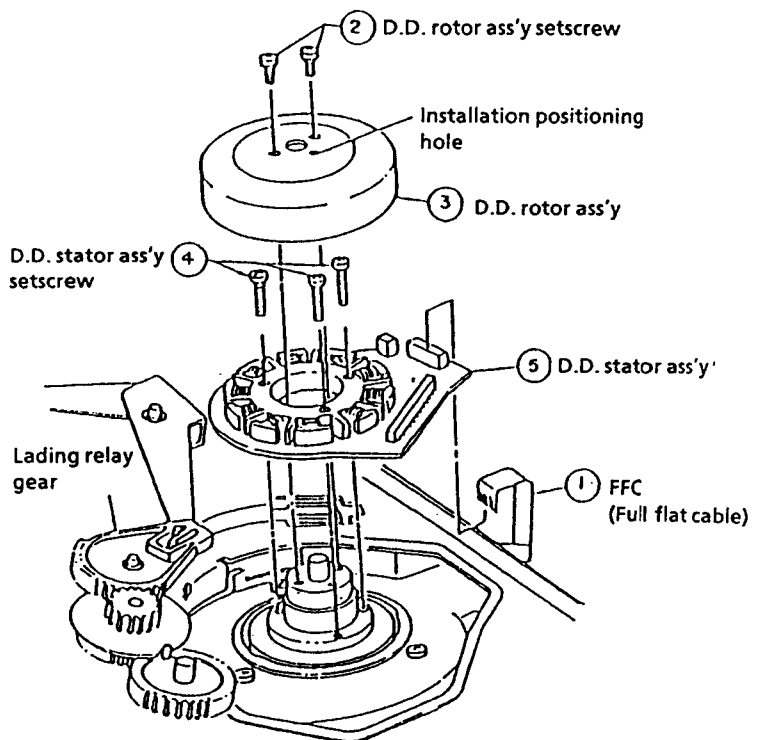


Figure 1-77.

- 1) When removing the D.D. rotor assembly and the D.D. stator assembly, use care not to hit them against the loading relay gear.
- 2) Match the positioning hole in the D.D. rotor assembly and that in the lower drum assembly with each other and secure them together.

Notes:

- 1) Be careful not to damage the upper drum and the video head.
- 2) Be careful not to give impacts to the Hall element, D.D. stator and D.D. rotor assemblies, and other component parts.
- 3) After installation, adjust the playback switching point.

REPLACING THE AHC (AUTOMATIC HEAD CLEANER)

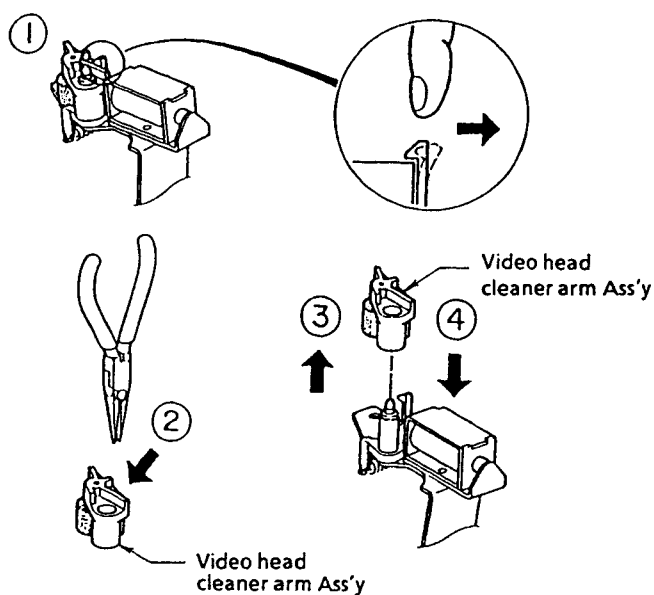


Figure 1-78.

● Removal

1. Unhook part ① with a finger in the direction arrow. Hold the rib (marked with an arrow) of the video head cleaner arm Ass'y ② with electrician's pliers or the like, and pull the Ass'y upward in the direction of arrow ③.

● Reassembly

1. Push down the video head cleaner arm assembly in the direction of arrow ④. Make sure that the Ass'y is secured in position by the hook of part ①.

Notes:

- Be careful to keep the video head cleaner arm Ass'y out of contact with the drum.
- Be careful to keep the cleaner section of the Ass'y clean free of grease and contaminants.

ADJUSTMENT OF THE ELECTRICAL CIRCUITRY

Prior to the adjustment:

In most cases, necessity for electrical circuits will arise from replacement of mechanical parts including the video head. Before starting adjustment of electrical circuits, check that mechanical operation of the equipment is complete (the mechanism are adjusted completely).

If the equipment fails electrically, locate a defect or defects first of all using instruments. Then repair or replace parts and make adjustment by the procedures described below.

When required instruments are not available, do not move controls indiscriminately.

- Instruments
 - Colour monitor TV
 - DC regulated power supply
 - VTVM
 - Oscilloscope
 - Audio generator
 - Colour bar generator
 - Alignment tape
 - Frequency counter
 - Blank video tape(VHS)

ADJUSTMENT OF SYSTEM CONTROL / SERVO CIRCUIT

- Test points layout

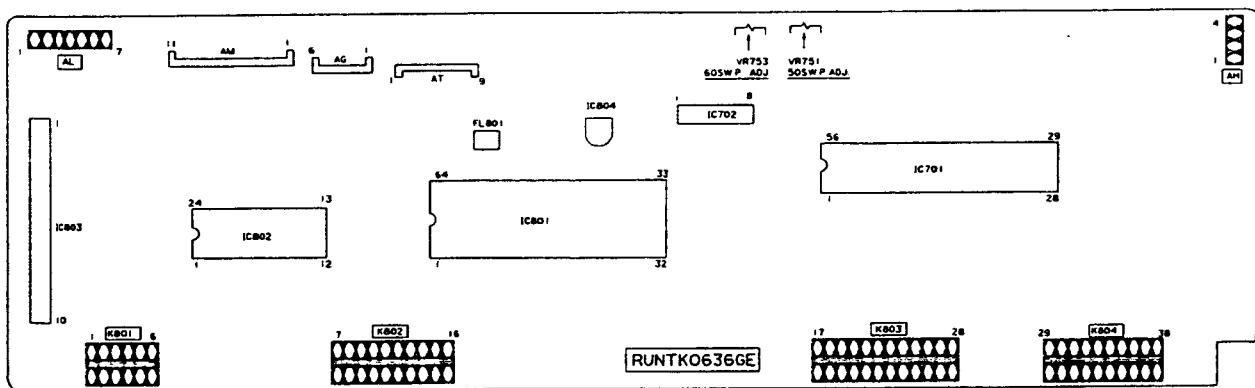


Figure 2-1 . SYSTEM / SERVO PWB

■ ADJUSTMENT OF SERVO CIRCUIT

Adjustment of PAL System playback switching point

Measuring instrument	Oscilloscope
Mode	Playback (tracking at center)
Tape used	Alignment tape (VROCPSV)
Test point	CH-1; TP2 CH-2; Video output terminal. (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side)
Control	R751 (phase generator MM control)
Specification	$6.5 \pm 0.5H$

1. Insert the PAL system alignment tape (VROCPSV) and put the unit in the playback mode.
2. Press both tracking control button at the same time to set the tracking in center.
3. Adjust R751 (phase generator MM control) so that the waveform on the oscilloscope screen be as shown in Figure 2-2.

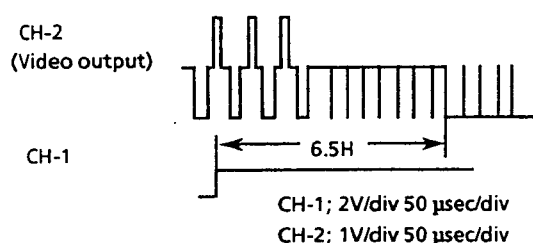


Figure 2-2.

Adjustment of NTSC System playback switching point

Measuring instrument	Oscilloscope
Mode	Playback (tracking at center)
Tape used	Alignment tape (VROATSV)
Test point	CH-1; TP2 CH-2; Video output terminal. (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side)
Control	R753 (phase generator MM control)
Specification	$6.5 \pm 0.5H$

1. Insert the NTSC system alignment tape (VROATSV) and put the unit in the playback mode.
2. Press both tracking control button at the same time to set the tracking in center.
3. Adjust R753 (phase generator MM control) so that the waveform on the oscilloscope screen be as shown in Figure 2-3.

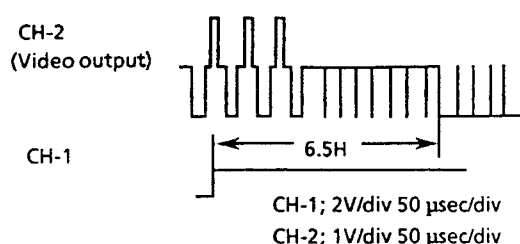


Figure 2-3.

Adjustment of PAL System SP Slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Commercial broadcast or video signal. (external input selector switch)
Test point	Monitor screen
Adjusting point	Tracking control button (+), (-)
Specification	No noise bar on the monitor TV screen.

1. Play back the self-recorded tape in the PAL System SP slow tracking mode.
2. Make the cathode of the timer D5003 and cathode of D5006 short-circuited.
3. Be sure that all the fluorescent display tubes light up.
4. Remove the short-circuit and make sure that "CASS" appears on all the above display tubes.
5. Adjust the tracking control using the TRACKING button on the main unit or the remote controller so that there is no noise on the screen.

Adjustment of NTSC System SP slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Commercial broadcast or video signal. (external input selector switch)
Test Point	Monitor screen.
Adjusting point	Tracking control button (+), (-)
Specification	No noise bar on the monitor TV screen.

1. Play back the self-recorded tape in the NTSC system SP slow tracking mode.
2. Make the cathode of the timer D5003 and cathode of D5006 short-circuited.
3. Be sure that all the fluorescent display tubes light up.
4. Remove the short-circuit and make sure that "CASS" appears on all the above display tubes.

- Adjust the tracking control using the TRACKING button on the main unit or the remote controller so that there is no noise on the screen.

Adjustment of PAL System LP slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Commercial broadcast or video signal. (external input selector switch)
Test point	Monitor screen.
Adjusting point	Tracking control button (+), (-)
Specification	No noise bar on the monitor TV screen.

- Play back the self-recorded tape in the PAL System LP slow tracking mode.
- Make the cathode of the timer D5003 and cathode of D5006 short-circuited.
- Be sure that all the fluorescent display tubes light up.
- Remove the short-circuit and make sure that "CASS" appears on all the above display tubes.
- Adjust the tracking control using the TRACKING button on the main unit or the remote controller so that there is no noise on the screen.

Adjustment of NTSC System EP slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Commercial broadcast or video signal. (external input selector switch)
Test point	Monitor screen.
Adjusting point	Tracking control button (+), (-)
Specification	No noise bar on the monitor TV screen.

- Play back the self-recorded tape in the NTSC system EP slow tracking mode.
- Make the cathode of the timer D5003 and cathode of D5006 short-circuited.
- Be sure that all the fluorescent display tubes light up.
- Remove the short-circuit and make sure that "CASS" appears on all the above display tubes.
- Adjust the tracking control using the TRACKING button on the main unit or the remote controller so that there is no noise on the screen.

Adjustment of PAL System still picture vertical sync

Measuring instrument	Monitor TV
Mode	Still picture playback
Input signal	Self-recording tape
Test point	Monitor screen
Adjusting point	Tracking control button (+), (-)
Specification	No noise jitter

- Play back the self-recorded tape in the PAL System SP still mode.
- Using the TRACKING button on the main unit or the remote controller, make adjustment so that jitter becomes minimum.
- Now press the STOP button to stop the tape.

Adjustment of NTSC System still picture vertical sync

Measuring instrument	Monitor TV
Mode	Still picture playback
Input signal	Self-recording tape
Test point	Monitor screen
Adjusting point	Tracking control button (+), (-)
Specification	No noise jitter

- Play back the self-recorded tape in the NTSC System SP still mode.
- Using the TRACKING button on the main unit or the remote controller, make adjustment so that jitter becomes minimum.
- Now press the STOP button to stop the tape.

ADJUSTMENT OF Y / C CIRCUIT

- **Test points layout**

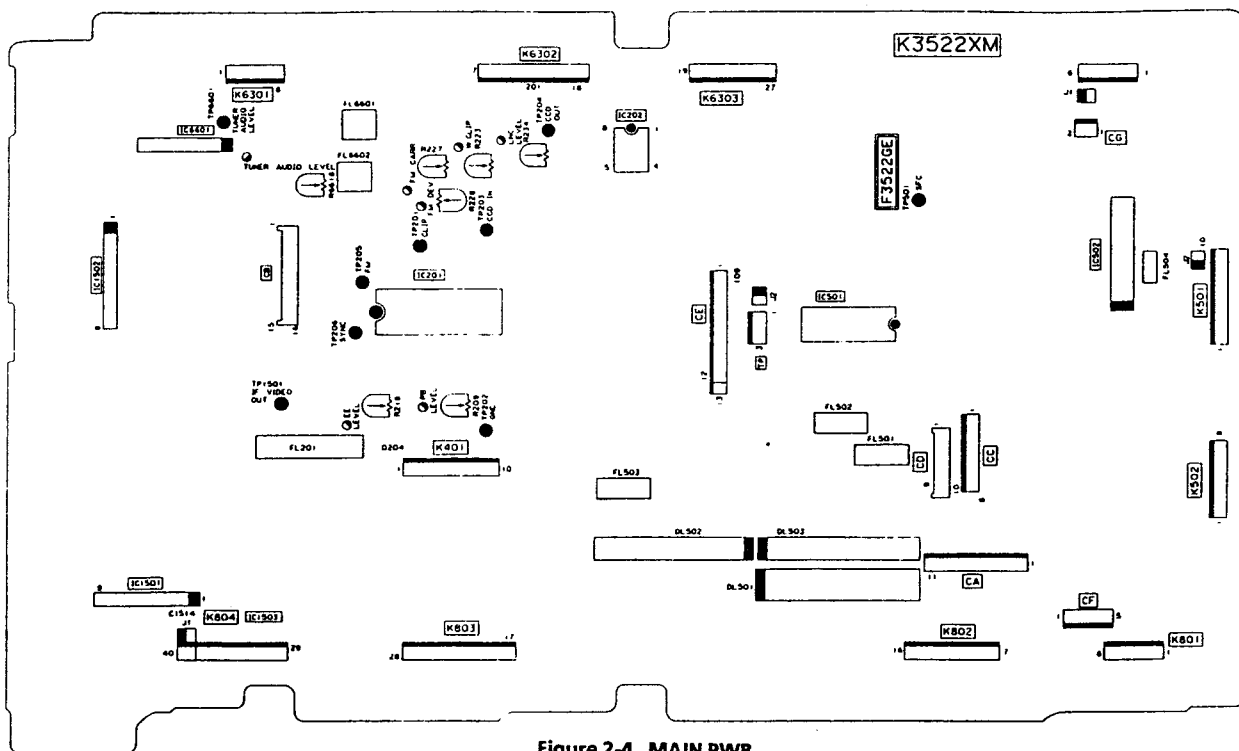


Figure 2-4 . MAIN PWB

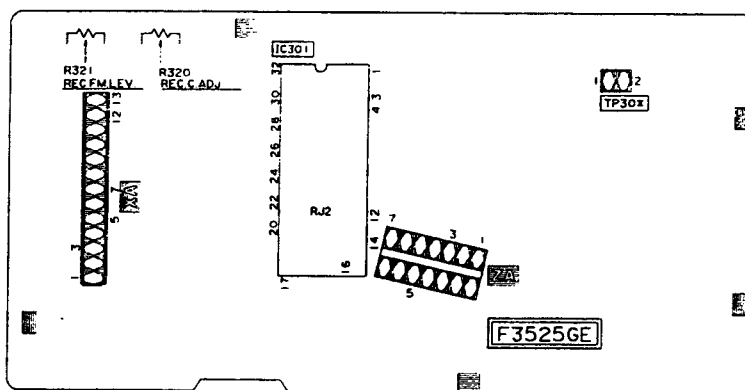


Figure 2-5. HEAD AMP PWB

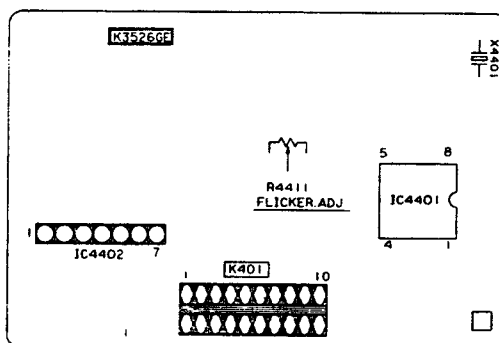


Figure 2-6. NTSC SKEW PWB

■ ADJUSTMENT OF Y/C CIRCUIT

Adjustment of EE level

Measuring instrument	Oscilloscope
Mode	Recording
Input signal	Standard colour bar (stair-case waveform)
Test point	Video output terminal
Adjusting point	R218 (EE level control)
Specification	$2.0 \pm 0.1\text{Vp-p}$ (not terminated)

1. Set the unit in record mode.
2. Feed the colour bar signal to the video input terminal. Observe the voltage the pin 9 of IC201 on the oscilloscope screen, adjust R218 (EE level control) to obtain the value indicated in Figure 2-7.

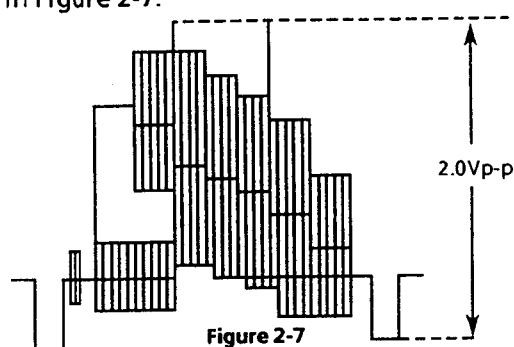


Figure 2-7

Adjustment of white clip

Measuring instrument	Oscilloscope
Mode	Recording
Input signal	Standard colour bar (stair-case waveform)
Test point	TP201
Adjusting point	R223 (white clip control)
Specification	$80 \pm 4\%$

1. Place the unit to the record mode.
2. Feed the colour bar signal to the video input terminal.
3. Turn R227 clockwise to maximum position.
4. Observing the output at TP201, adjust R223 (white clip control) so that the white peak overshoot be $80 \pm 4\%$.
5. Make sure that the dark peak overshoot is $50 \pm 10\%$.

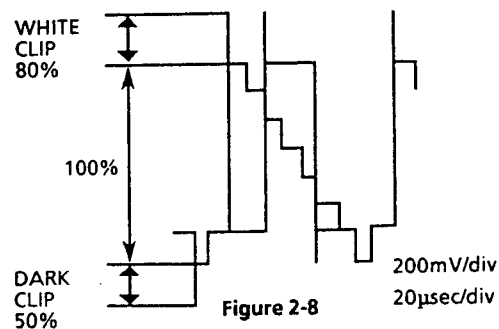


Figure 2-8

Adjustment of FM3.8MHz and 4.8MHz

Measuring instrument	Frequency counter	Oscilloscope
Mode	Recording	Self-recording / playback
Input signal	External input (no signal)	Standard colour bar (stair-case waveform)
Test point	TP205 (Signal) TP202 (Ground)	Video output terminal
Adjusting point	R227 (FM carrier control)	R228 (Deviation control)
Specification	3.8 MHz \pm 50KHz	$1.0 \pm 0.04\text{Vp-p}$

Note.1:

Carry out this adjustment only when IC201 has been replaced or when the carrier setting(3.8MHz) or the deviation(4.8MHz) is found apparently out of specification. Make this adjustment after the EE level has been completely adjusted.

Note.2:

The video output terminal should be terminated with a 75-ohm impedance.

1. First make sure that the EE video signal level is at the specified level.
2. Place the unit in the record mode and get it ready for external input.

Note:

Do not connect anything to the external input terminal.

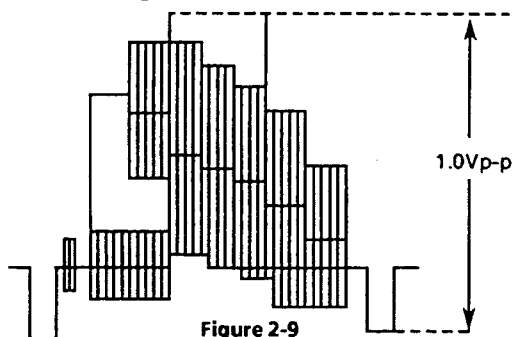
3. Hook up the frequency counter to TP205 and TP202. Adjust R227(FM carrier control) so that the counter reading be 3.8MHz.

Note:

Make sure the white clip control is not now applied to the waveform.

4. Feed the colour bar signal and make self-recording and playback.

5. Observe the video output terminal voltage (across the terminal resistor) on the oscilloscope screen. If the playback video signal level is above 1.0Vp-p, turn R228(deviation control) clockwise. If below 1.0Vp-p, turn the control counter-clockwise. Now make self-recording and playback again.
6. Repeat the above step 5 to finally get the playback video signal level at $1.0 \pm 0.04\text{Vp-p}$, as shown in Figure-2-9.



Adjustment of recording current

Measuring instrument	Oscilloscope	
Mode	Recording	
Input signal	Standard colour bar (stair-case waveform)	
Test signal	TP301 (GND at TP302) External trigger (video output terminal)	
Adjusting point	R321 (recording Y control)	R320 (recording chroma control)
Specification	Sync tip level $84 \pm 4\text{mVp-p}$	Red level $23 \pm 1\text{mVp-p}$

Note:

TP301 and TP302 are located on the head amp PWB.

1. Place the unit to the record mode.
2. Feed the colour bar signal to the video input terminal.
3. Observing the waveform on the oscilloscope screen (external trigger at video output terminal), take the following steps.
 - a) Connect the oscilloscope's ground and signal leads to TP302 and TP301, respectively.
 - b) Turn R321 (recording Y control) to minimum.
 - c) Adjust R320 (recording chroma control) so that the red level be $23 \pm 1\text{mVp-p}$ as shown in Figure2-11.
4. Adjust R321 (recording Y control) so that the sync tip be $84 \pm 4\text{mVp-p}$ as shown in Figure2-12.

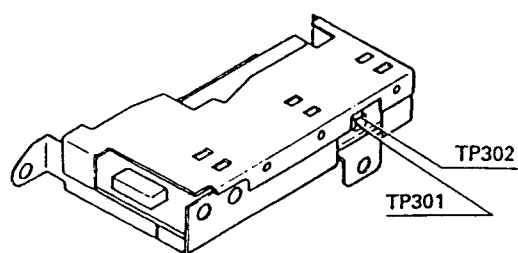


Figure 2-10.

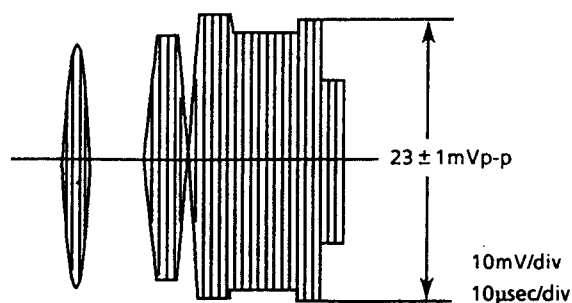


Figure 2-11.

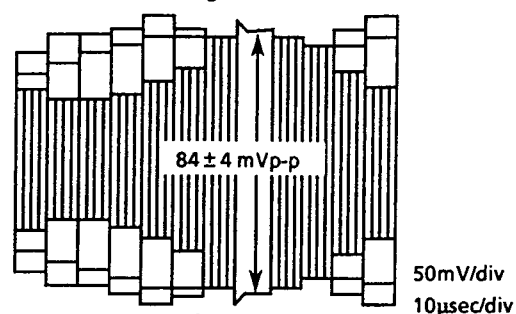


Figure 2-12.

■ ADJUSTMENT OF Y/C PLAYBACK CIRCUIT

Adjustment of playback video signal level

Measuring instrument	Oscilloscope
Mode	Playback
Tape used	Alignment tape (VROCPSV) (stair-case waveform)
Test point	Video output terminal
Adjusting point	R209 (playback level control)
Specification	$2.0 \pm 0.1\text{Vp-p}$ (not terminated)

1. Insert the alignment tape and place the unit to the playback mode.
2. Hook up the oscilloscope to video output terminal. Adjust R209 (playback level control) so that the on-screen waveform be $2.0 \pm 0.1\text{Vp-p}$ as shown in Figure2-13.

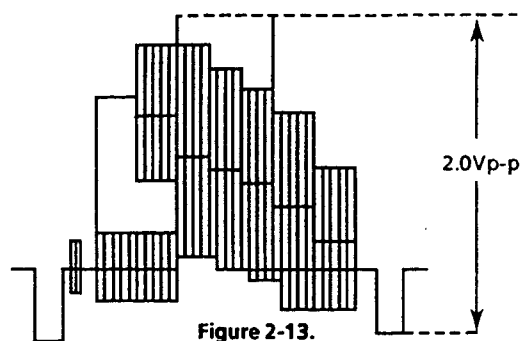


Figure 2-13.

Adjustment of delay level

Measuring instrument	Dual-beam oscilloscope
Mode	Playback
Tape used	Alignment tape (VROCPSV) (stair-case waveform)
Test point	CH-1; TP203 CH-2; TP204
Adjusting point	R234 (delay level control)
Specification	CH-2 level = CH-1 level

1. Insert the alignment tape and play it.
2. Adjust R234 (delay level control) so that the levels of CH-1 and CH-2 are the same as shown in Figure-2-14.

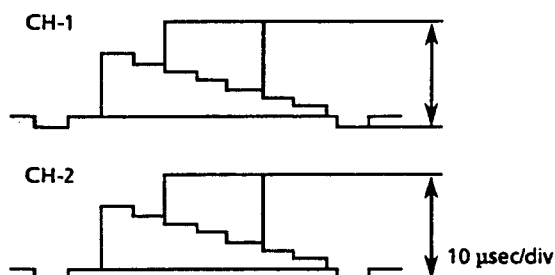


Figure 2-14.

Adjustment of the APC (PAL)

Measuring instrument	Frequency counter
Mode	Playback
Tape used	Alignment tape (VROCBFFS) (stair-case waveform)
Test point	TP501
Adjusting point	C521 (APC control)
Specification	4.433619MHz \pm 20Hz

1. Insert the alignment tape and place the unit to the playback mode.
2. Connect the frequency counter to TP501. Adjust C521 (APC control) so that the counter reading be 4.433619MHz \pm 20Hz.

Adjustment of the APC (NTSC)

Measuring instrument	Frequency counter
Mode	Playback
Tape used	Alignment tape (VROCPSV) (stair-case waveform)
Test point	TP501
Adjusting point	C525 (APC control)
Specification	3.579545MHz \pm 20Hz

1. Insert the alignment tape and place the unit to the playback mode..
2. Connect the frequency counter to TP501. Adjust C525 (APC control) so that the counter reading be 3.579545MHz \pm 20Hz.

Adjustment of NTSC Skew Compensation

Measuring instrument	Oscilloscope Monitor TV
Mode	Playback (SP still mode)
Tape used	Alignment tape (VROCPSV)
Test point	CH-1 : TP2 CH-2 : Video output terminal
Adjusting point	R4411 (Flicker control)
Specification	No flicker on the monitor TV screen

1. Insert the alignment tape (VROCPSV) and place the unit to the playback still mode.
2. Observe the output of TP2 (head switching pulse) and video output with an oscilloscope.
3. Adjust R4411 so that there is a video level difference of \pm 0.1V between Channel-1 output (head switching pulse's High level) and Channel-2 output (head switching pulse's Low level).
4. If the colour flicker is so noticeable on the TV monitor, finely adjust R4411 so that there is the least deviation of flicker on the screen.

■ ADJUSTMENT OF SECAM SUB CHROMA CIRCUIT

Adjustment of record mode

Measuring instrument	Oscilloscope
Mode selection	Record mode
Input signal	Colour bar signal
Measuring point	TP5706
Adjusting Control	T5703 (bell filter)
Specified value	—

1. Set the unit in the record mode.
2. Apply a SECAM colour bar signal to the unit and record it.
3. Observe the output of TP5706 with an oscilloscope, and adjust T5703 so that the chroma signal becomes flat as shown in Fig. 2-15.

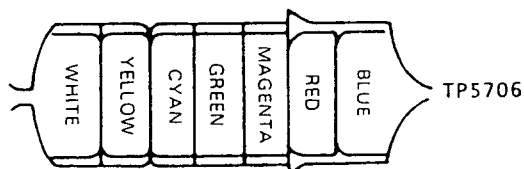


Figure 2-15.

Adjusting of sync gate in the record mode

Measuring instrument	Oscilloscope
Mode selection	Record mode
Input signal	Colour bar signal
Measuring point	TP5707 Video output terminal
Adjusting control	R5814 (Sync gate adj.) R5815 (Sync gate adj.)
Specified value	T ₁ : 1.5μsec T ₂ : 5.6μsec

1. Apply a SECAM colour bar signal to the unit and record it.
2. Connect an oscilloscope to TP5702 and video output terminal and make sure that the chroma signal output is just as shown in Fig 2-16.
3. Adjust R5814 and R5815 so that the intervals T₁ and T₂ in the waveform of the output at TP5705 and those in the video output waveform should be corresponding to each other.

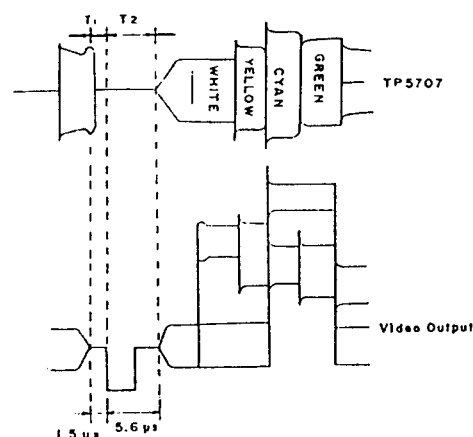


Figure 2-16.

Adjustment of recording equalizer (T5702)

1. Adjust T5702 so that the output at point ① should be as shown in Fig. 2-17.

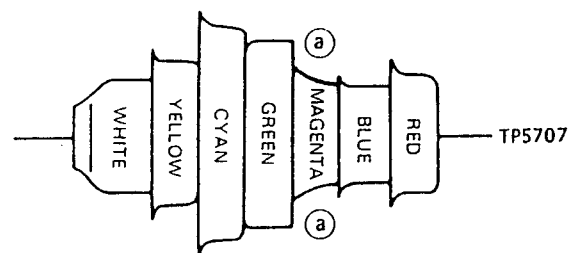


Figure 2-17.

Adjustment of record current (SECAM)

Measuring instrument	Oscilloscope
Mode selection	Record mode
Input signal	Colour bar signal
Measuring point	TP301 (Ground : TP302)
Adjusting control	R5813 (Record chrominance level control)
Specified value	Cyan level : 20 ± 2mVp-p

1. Set the unit in the record mode.
2. Apply a SECAM colour bar signal (stair-step waveform) to the unit.
3. Observe the output of TP301 with an oscilloscope and make adjustment in the following manner.

- a) Connect the ground of the oscilloscope to TP302 and the signal to TP301.

Note :

TP301 and TP302 are located on the head amplifier PWB.

- b) Adjust R5813 (record chroma control) so that the red level should be 20mVp-p as shown in Figure 2-18.

Note :

R5813 is located in the system control, servo PWB.

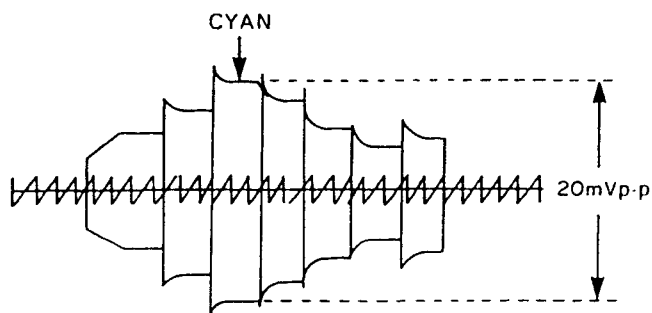


Figure 2-18.

● Test points Layout

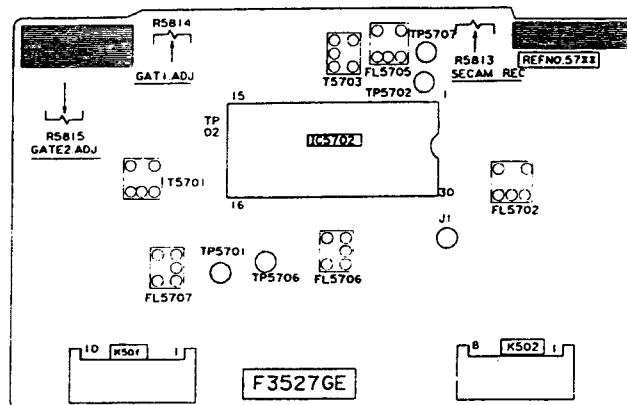


Figure 2-20. SUB CHROMA PWB

Adjustment of playback equalizer

Measuring instrument	Oscilloscope
Mode selection	Playback mode
Input signal	Alignment tape (VROCSSLV)
Measuring point	TP5702
Adjusting control	T5701 (playback equalizer)
Specified value	_____

1. Set the unit in the playback mode, and playback an alignment tape.
2. Observe the output of TP5702 with an oscilloscope, and using T5701 make the oscillating width match with the flat portion of the red and blue test pattern.

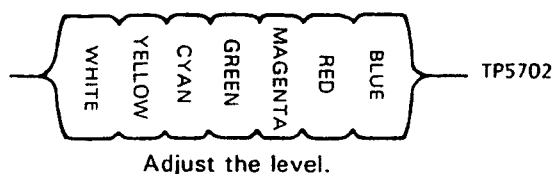
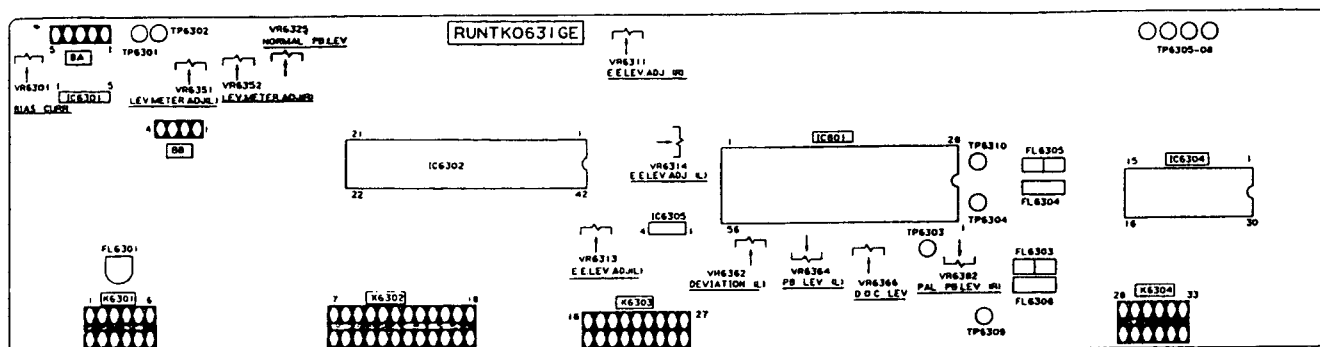


Figure 2-19.

- **Test Points Layout**



(The items in brackets [] refer to R-CH parts.)
Adjustment of EE level

Measuring instrument	VTVM
Mode	EE (PAL)
Input signal	-8dBs, 1kHz
Test point	Audio output terminal
Adjusting point	R6313 [R6311]
Specification	-8dBs

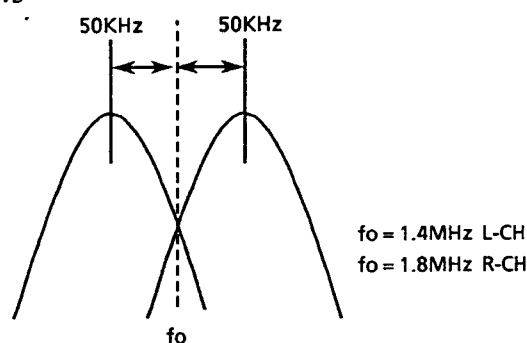


Figure 2-22.

- Note:**

Note:
Both R6313 and R6311 are located on the operation unit. Adjustment of deviation.

(Adjustment by using a spectrum-analyser)

Measuring instrument	Spectrum-analyser
Mode	REC (PAL)
Input signal	−8dBs, 1kHz
Test point	TP6309 [TP6310] TP6306 (GND)
Adjusting point	R6362 [R6374] (deviation control)
Specification	50 ± 5kHz

- (Adjustment by using a frequency counter and an VTVM)**

Measuring instrument	Frequency counter, VTVM
Mode	Recording / Playback
Tape used	Hi-Fi alignment tape (VROCBFFS)
Input signal	- 8dBs, 1kHz
Tast point	TP6309 [TP6310] TP6306 (GND)
Adjusting point	R6362 [R6374]
Specification	- 8 ± 1dBs

1. Play back the Hi-Fi alignment tape (VROCBFFS) and check that the playback level is -8 ± 1 dBs.
2. Check the carrier frequency: connect a frequency counter to TP6309 [TP6310] and TP6306 (GND) check that the reading is $1.4 \text{ MHz} \pm 10\text{kHz}$ [$1.8\text{MHz} \pm 10\text{kHz}$].
3. Input -8 dBs, 1kHz signal to the audio line input terminal.
4. Set the recording level control to the center click position.
5. Record the signal and play it back. If the playback level is less than -8 ± 1 dBs, turn R6362 [R6374] clockwise; if more than -8 ± 1 dBs, turn it counterclockwise. Record the signal and play it back again.
6. Repeat Step 5 until you obtain a reading of $-8 \text{ dBs} \pm 1$ dBs.

Adjustment of drop out level

Measuring instrument	VTVM
Mode	Playback (PAL)
Input signal	_____
Test point	TP6303, TP6306 (GND)
Adjusting point	R6366 (drop out level control)
Specification	$3.8 \pm 0.1V$

1. Put the set in playback mode.
2. Connect an VTVM to TP6303 and TP6306, and adjust R6366 (drop out level) so that output available on the oscilloscope is $3.8V \pm 0.1V$.

Checking of playback switching point

Measuring instrument	Oscilloscope
Mode	Playback (PAL / NTSC)
Tape used	Hi-Fi alignment tape VROCBFFS PAL VROATFCS NTSC
Test point	TP6305, TP6307
Adjusting point	_____
Specification	Longer than 100 μ sec.

1. Connect the oscilloscope's CH1 to TP6305 and its CH2 to TP6307. Connect the external trigger to TP2 (Main PWB).
2. Play back the standard HiFi tape (VROCBFFS). Externally trigger the circuitry. Observe the output at TP6305 and TP6307 at the same time on the oscilloscope screen.
3. Make sure that the envelope at TP6305 is longer than 100 μ sec. ahead of the leading edge, and behind the trailing edge, of the output at TP6307.

Notes:

1. Before making this adjustment, make sure that the video playback switching point has been accurately adjusted. Be sure to make this adjustment when this switching point has been adjusted.
If the measurement is out of specification, readjust the playback switching point to the 6.5-0.5H range.
2. Make this adjustment just after the A/C head height and azimuth have been adjusted. It is acceptable that the envelope is longer than 100 μ sec. ahead of the leading edge of the head switching pulse signal at TP6307.

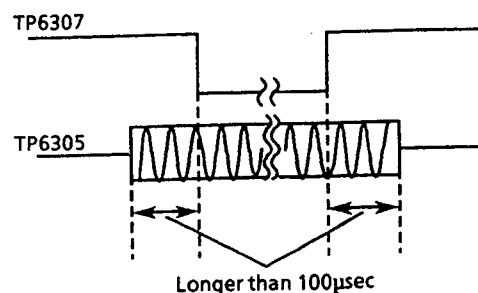


Figure 2-23.

Adjustment of Hi-Fi playback level

Measuring instrument	VTVM
Mode	Playback (PAL / NTSC)
Tape used	Hi-Fi alignment tape (VROCBFFS) (PAL) (VROATFCS) (NTSC)
Input signal	_____
Test point	Audio line output terminal (L, R)
Adjusting point	R6364 [R6382] (playback level control)
Specification	-8dBs \pm 1dBs

1. Playback the Hi-Fi alignment tape.
2. Connect CH-1 of an VTVM at the audio line output terminal (L), CH-2 of an VTVM at the audio output terminal (R) and then set the audio output select to Hi-Fi and stereo.
3. Adjust R6364 [R6382] to the point at which the playback level is -8dBs \pm 1dBs.

Adjustment of level meter

Measuring instrument	Level meter
Mode	EE (PAL)
Input signal	-8dBs, 1kHz
Test point	Level meter
Adjusting point	R6351 [R6352]
Specification	0dB Lights

1. Input -8dBs, 1kHz audio oscillator signal to the audio line input terminal.
2. Set the audio input switch to external.
3. Audio output switch should be set to stereo position.
4. Adjust R6351 [R6352] so that the level meter lights as for as the 0 dB point.
5. Then, receive a monaural signal, and adjust R6352 so that the input levels of both L-CH and R-CH become the same.

Adjustment of playback level

Measuring instrument	VTVM
Mode	Playback (PAL)
Input signal	Alignment tape (VROCP5V) (1kHz level control signal)
Test point	Audio output terminal
Adjusting point	R6325 (playback level control)
Specification	$-12 \pm 1\text{dBs}$ (L-ch side)

1. Play back the alignment tape (1kHz level control signal).
2. Hook up the VTVM to the audio output terminal.
3. Adjust R6325 (playback level control) so that the output level be $-12 \pm 1\text{dBs}$.

Checking of erase voltage and oscillation frequency

Measuring instrument	Oscilloscope
Mode	Recording (PAL)
Input signal	_____
Test point	Both ends of the full-erase head
Adjusting point	_____
Specification	Erase voltage; Over 40Vp-p Oscillation frequency; $70 \pm 10\text{kHz}$

1. Place the unit to the record mode.
2. Hook up the oscilloscope to both ends of the full-erase head.
3. Make sure the erase voltage is over 40 Vp-p.
4. Be sure that the oscillation frequency is $70 \pm 10\text{kHz}$.

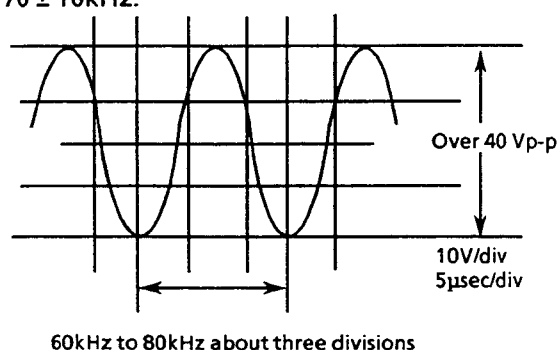


Figure 2-24.

Adjustment of bias current

Measuring instrument	VTVM
Mode	Recording (PAL)
Input signal	_____
Test point	TP6301 (SIG), TP6302 (GND)
Adjusting point	R6301 (bias current control)
Specification	$260 \pm 10\mu\text{A}$ ($2.6\text{mV} \pm 0.1\text{mV}$)

1. Connect the VTVM TO TP601 (SIG) and TP602 (GND) on the main unit.
2. Place the unit to the record mode.
3. Adjust R6301 (bias current control) so that the bias current be $260 \pm 10\mu\text{A}$ ($2.6 \pm 0.1\text{mV}$).

Checking of bias leak

Measuring instrument	VTVM
Mode	Recording (PAL / NTSC)
Input signal	_____
Test point	Audio output terminal
Adjusting point	_____
Specification	Less than -20dBm

1. Place the unit to the record mode.
2. Connect the VTVM to the audio output terminal.
3. Make sure the bias leak is below -20dBm .

Checking of recording /playback levels

Measuring instrument	VTVM
Mode	Self-recording/playback PAL / NTSC
Input signal	-8dBs , 1kHz
Test point	Audio output terminal
Adjusting point	_____
Specification	$-8 \pm 2\text{dBs}$

1. Feed 1kHz, -8dBs signal to the audio input terminal. Make self-recording and playback of the signal.

Note:

For Hi-Fi recording, feed the signal to the left and right channels at the same time.

2. Make sure the output at the audio output terminals is $-8 \pm 2\text{dBs}$ for playback mode.
3. If out of spec, readjust the erase voltage, oscillation Frequency and the bias current.

ADJUSTMENT OF IF CIRCUIT

Adjustment of RF AGC

Measuring instrument	Oscilloscope Signal generator
Mode	_____
Input signal	Colour bar signal
Test point	Video output terminal
Adjusting point	VR001 (on IF pack)

1. Receive the colour bar signal (input field strength: 80 dB μ).
2. Observe the video output terminal waveform on the oscilloscope. Adjust VR001 (on IF pack) in the IF pack until the noise disappears from the oscilloscope screen and the waveform nearly comes into sync.

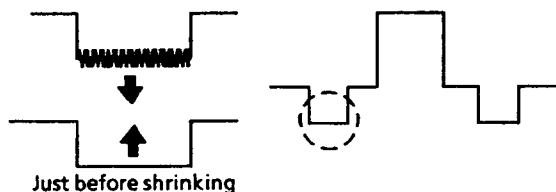


Figure 2-25.

Adjustment of AFT

Measuring instrument	Oscilloscope Signal generator
Mode	_____
Input signal	PIF frequency uniwave (38.9 MHz \pm 1kHz) Colour bar signal (70 dB μ)
Test point	Video output terminal
Adjusting point	T002 (AFT coil)
Specification	_____

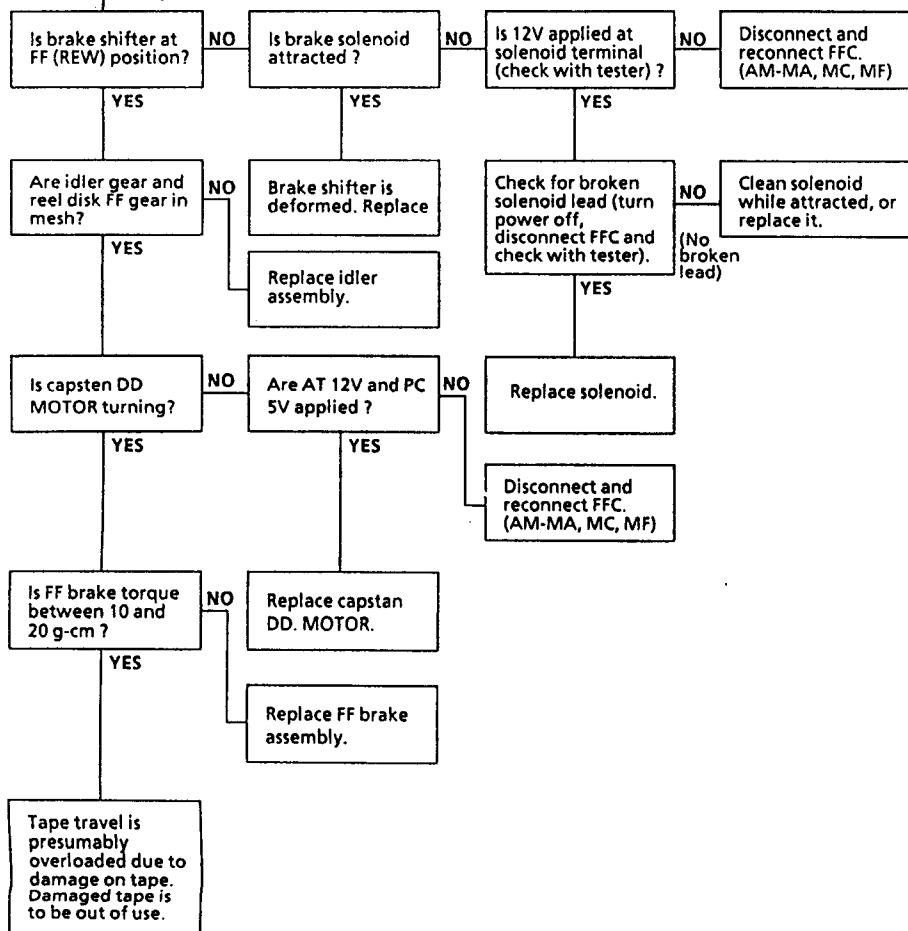
1. Receive the colour bar signal (input field strength: 70 dB μ).
2. First set the band selector switch to VHF or UHF Position.
Using the signal generator, feed the 38.9-MHz PIF frequency signal (sine wave) to the tuner IF output terminal.
Use the (-) and (+) keys so that the video output terminal waveform be minimum.
3. Set the band selector switch normal position.

4. Using the signal generator, feed the 38.9-MHz \pm 1kHz PIF frequency signal (sine wave) to the tuner IF output terminal.
(Adjust the attenuator to attenuate the input signal down to an appropriate level).
5. Adjust T002 (AFT coil) in the IF pack so that the video output terminal waveform be minimum.

MECHANISM TROUBLESHOOTING

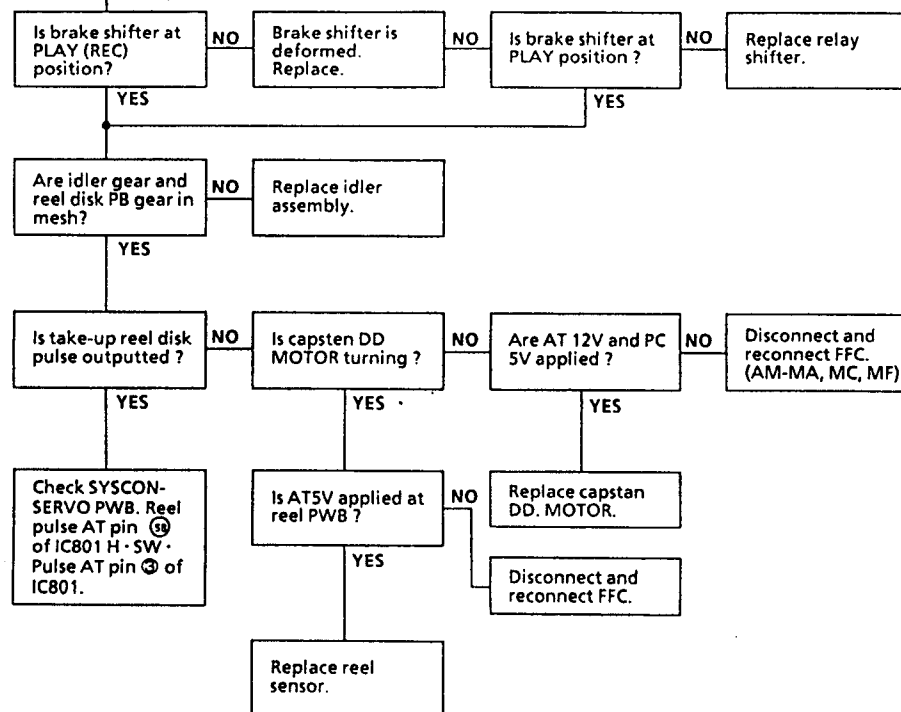
1. FF/REW FAILURE (NO TAPE WINDING)

Remove cassette controller, turn power on and press FF key.

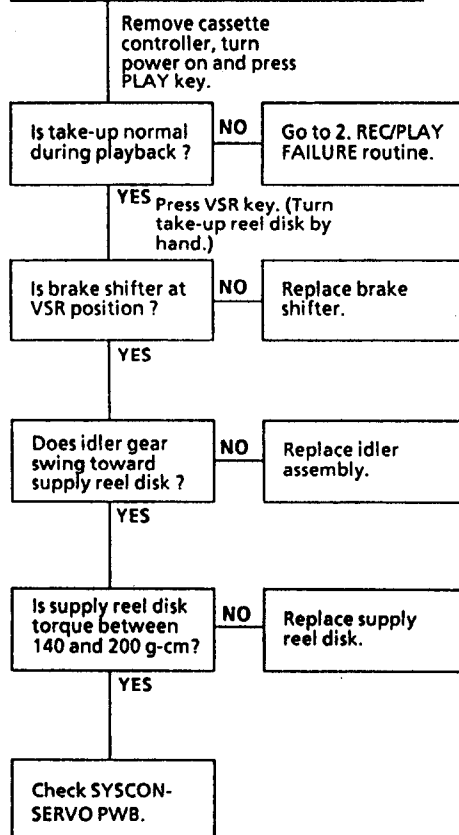


2. REC/PLAY FAILURE (MODE RELEASE)

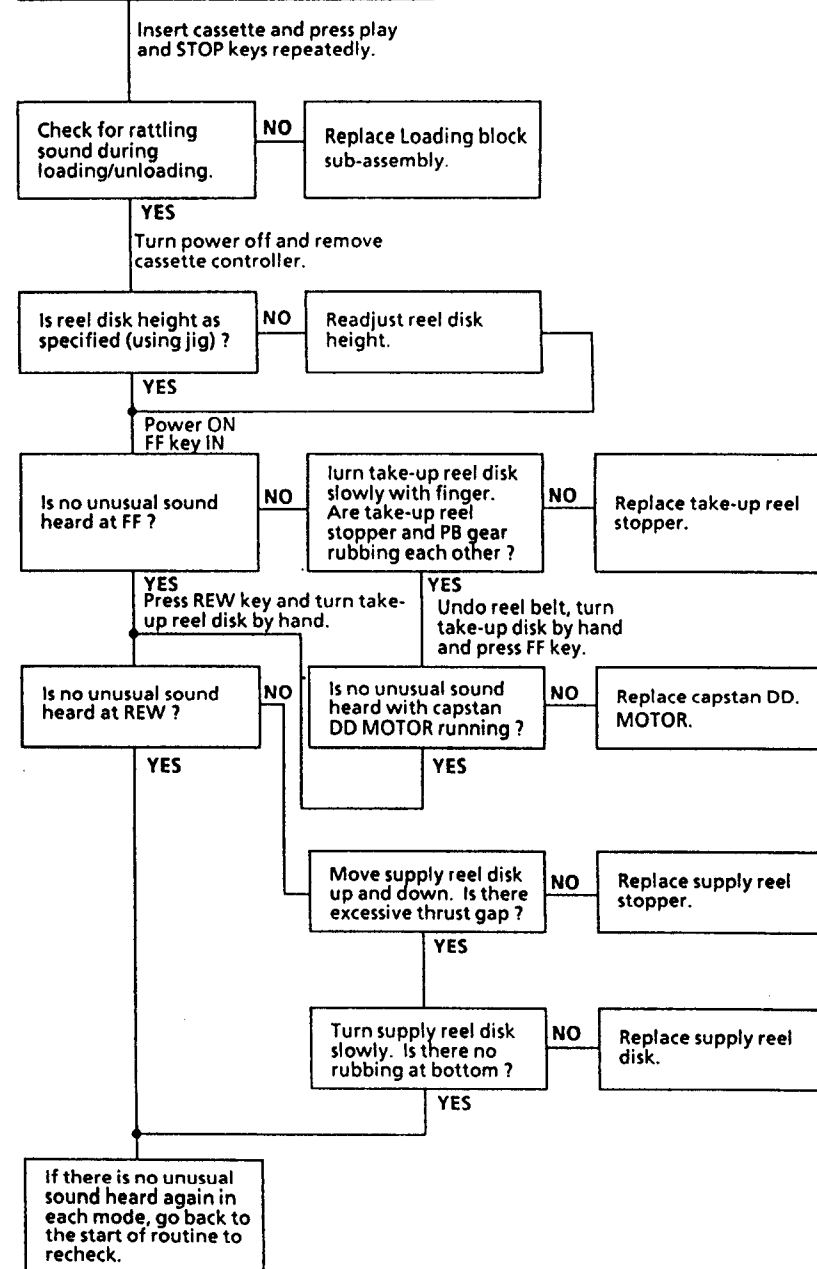
Remove cassette controller, turn power on and press PB key.



3. WINDING FAILURE AT VSR

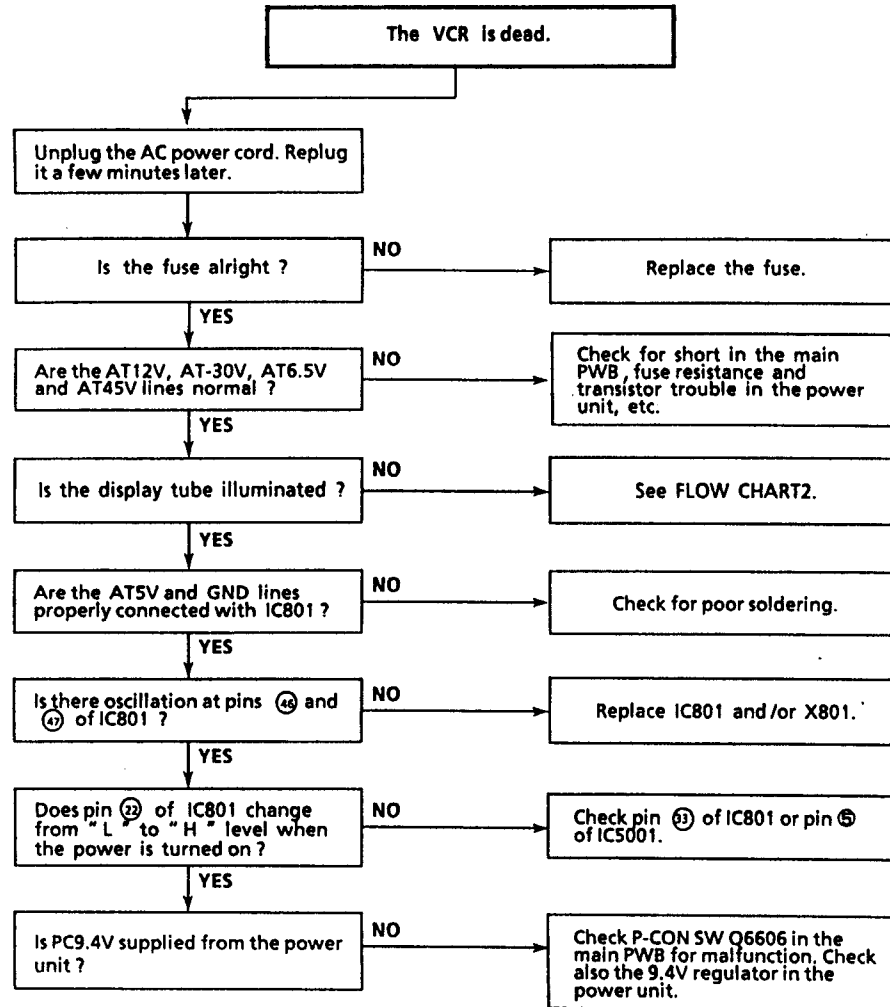


4. UNUSUAL SOUND IN EACH MODE



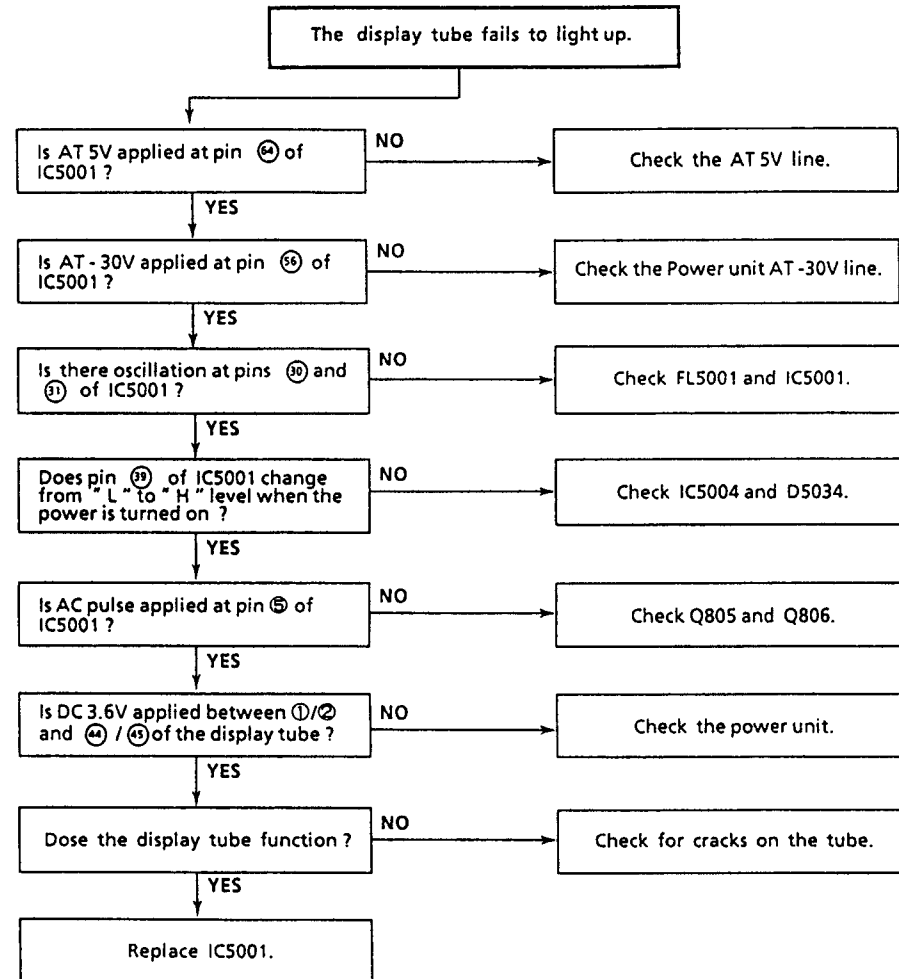
POWER TROUBLESHOOTING

FLOW CHART NO. 1



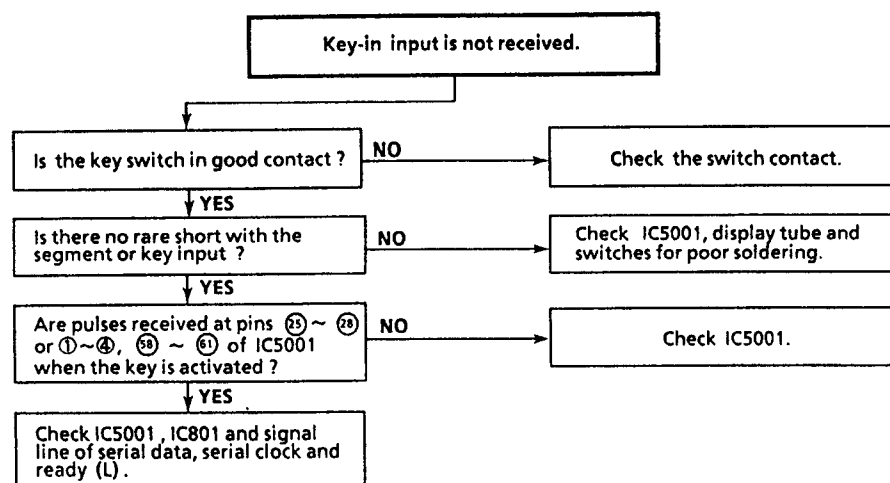
TIMER (1) TROUBLESHOOTING

FLOW CHART NO. 2



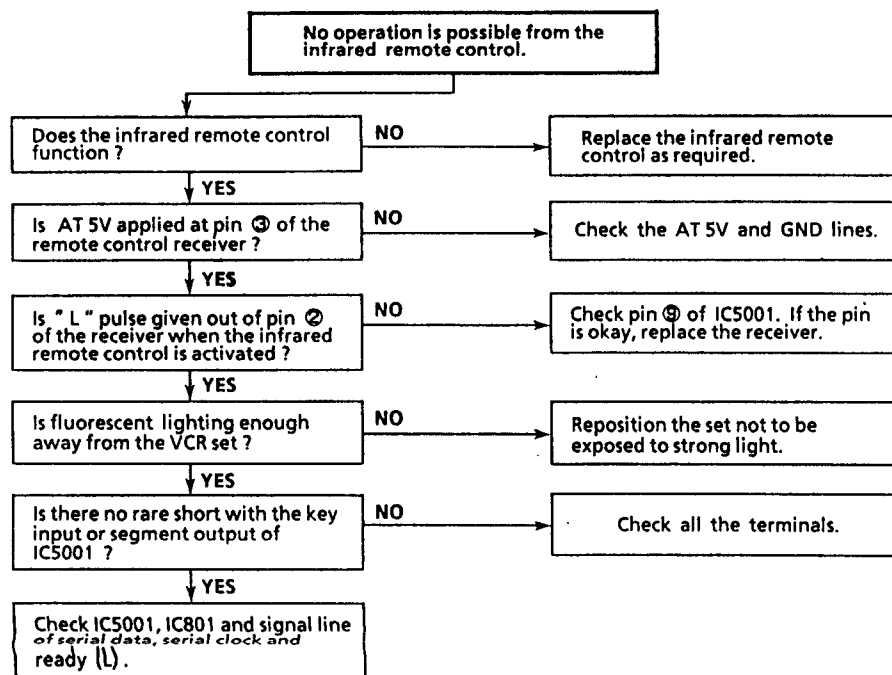
TIMER (2) TROUBLESHOOTING

FLOW CHART NO. 3



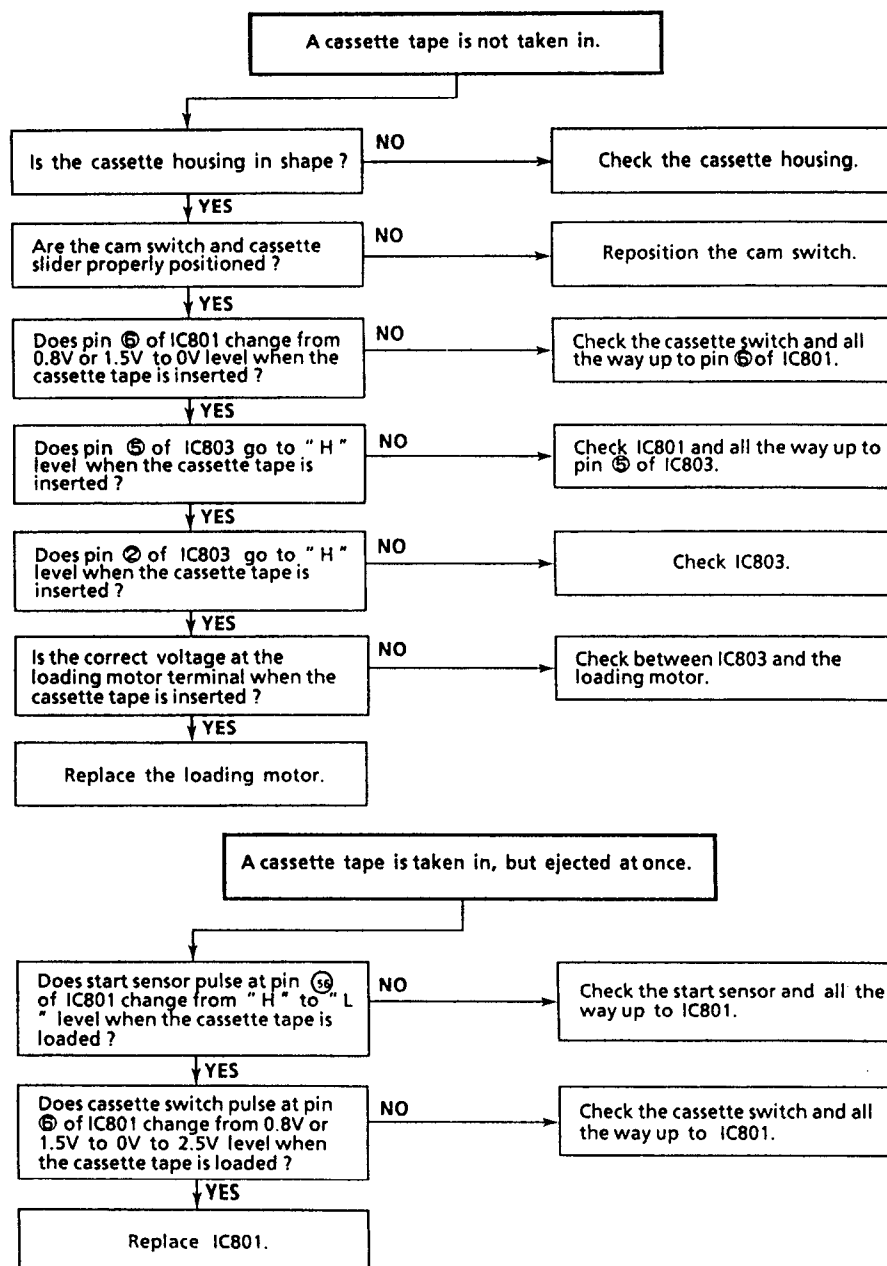
INFRARED R/C TROUBLESHOOTING

FLOW CHART NO. 4



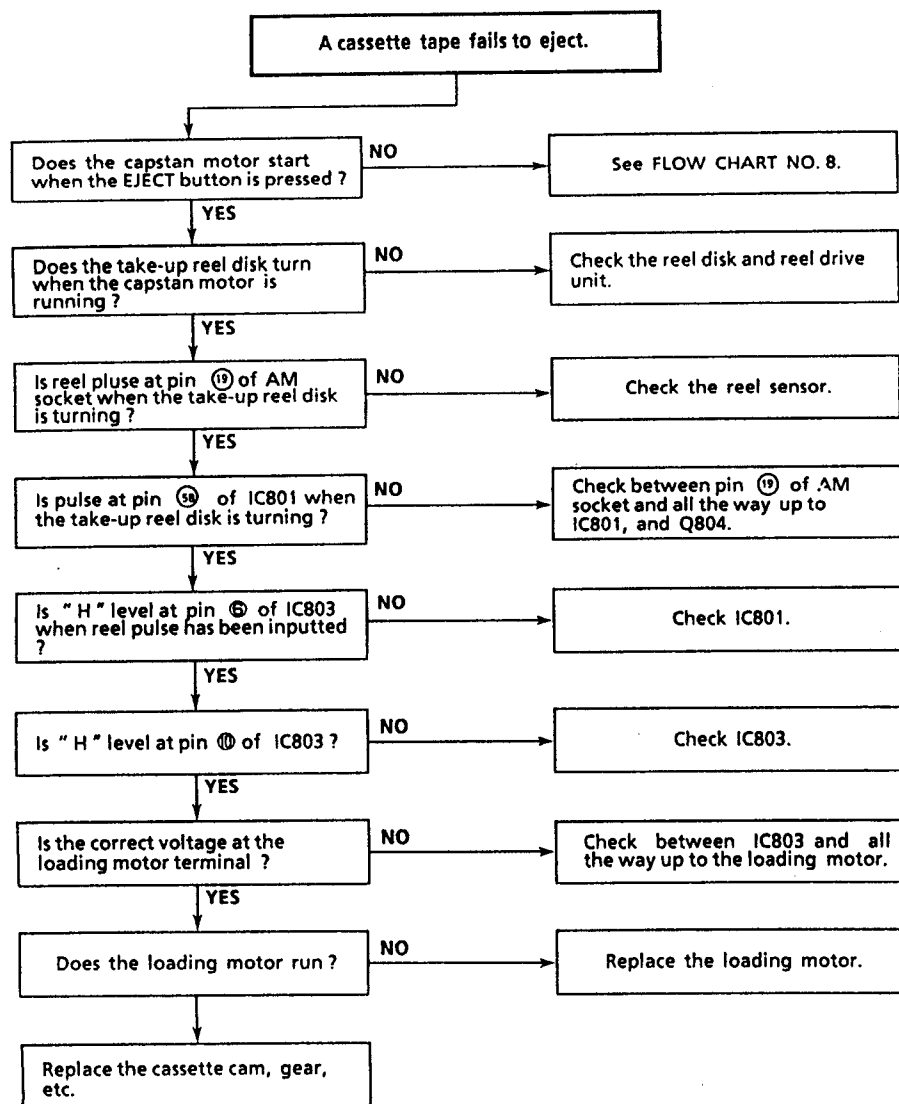
CASSETTE CONTROL TROUBLESHOOTING

FLOW CHART NO. 5



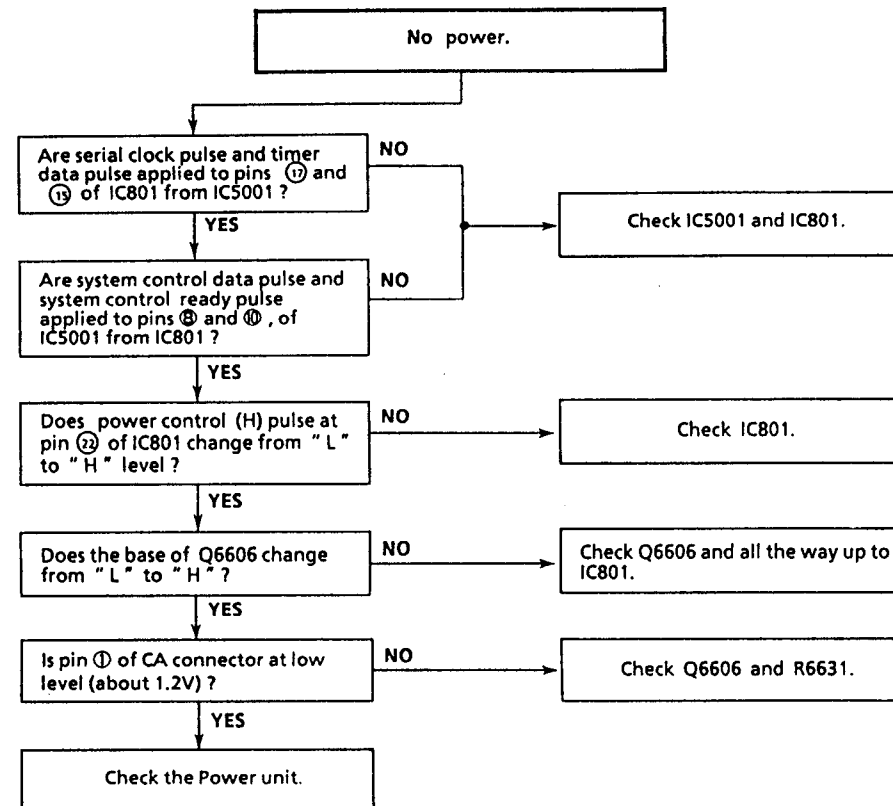
LOADING MOTOR AND EJECT TROUBLESHOOTING

FLOW CHART NO. 6



SYSTEM CONTROL TROUBLESHOOTING

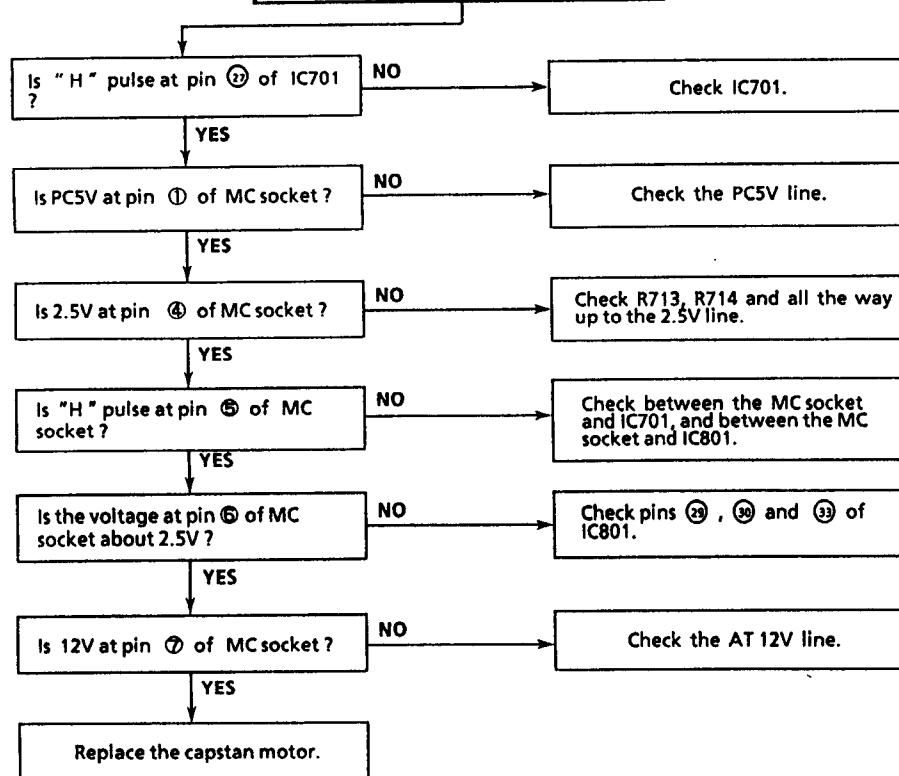
FLOW CHART NO. 7



CAPSTAN MOTOR TROUBLESHOOTING

FLOW CHART NO. 8

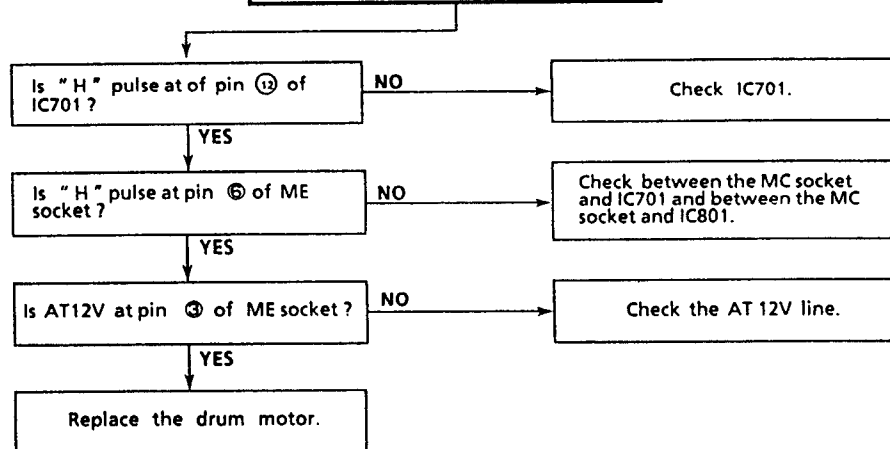
The capstan motor fails to run.



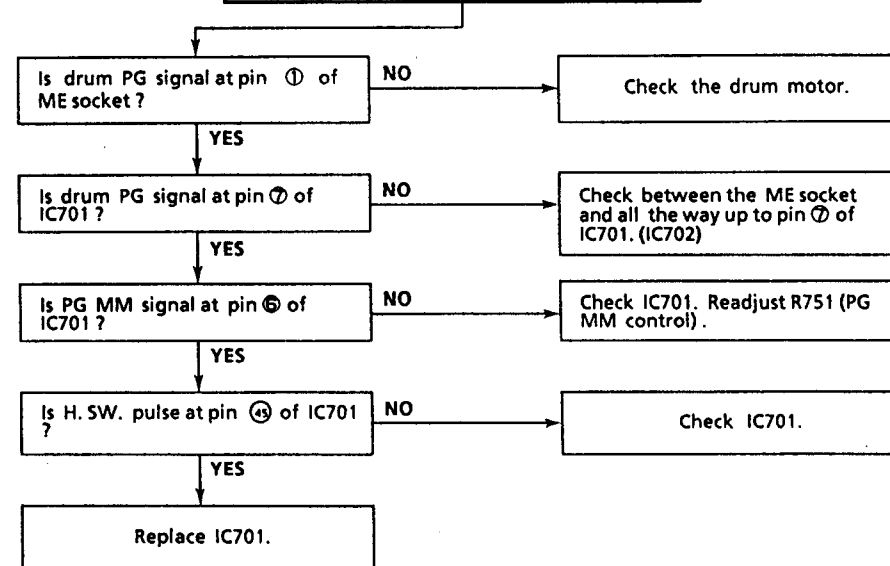
DRUM MOTOR TROUBLESHOOTING

FLOW CHART NO. 9

The drum motor fails to run.

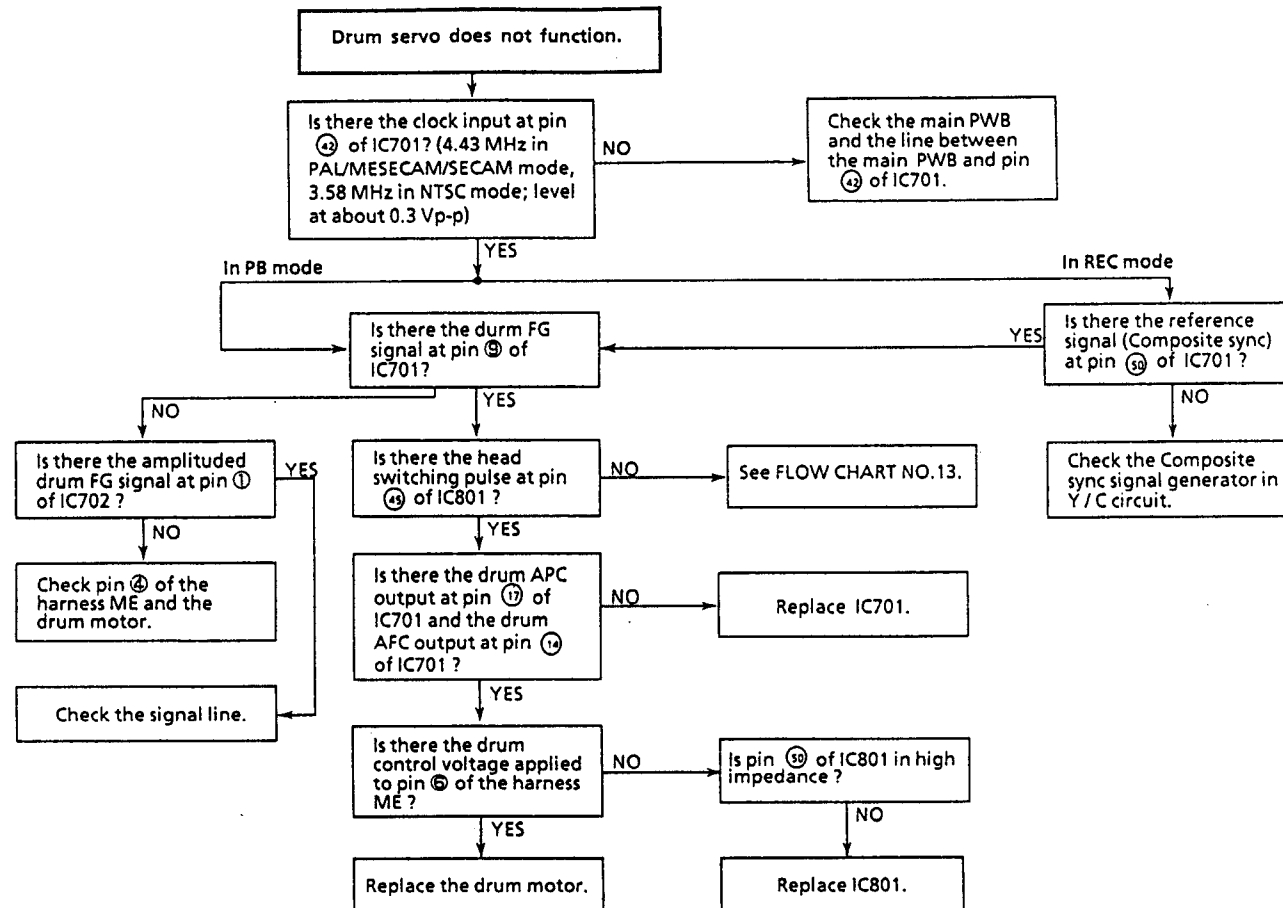


The drum motor runs only for a few seconds.



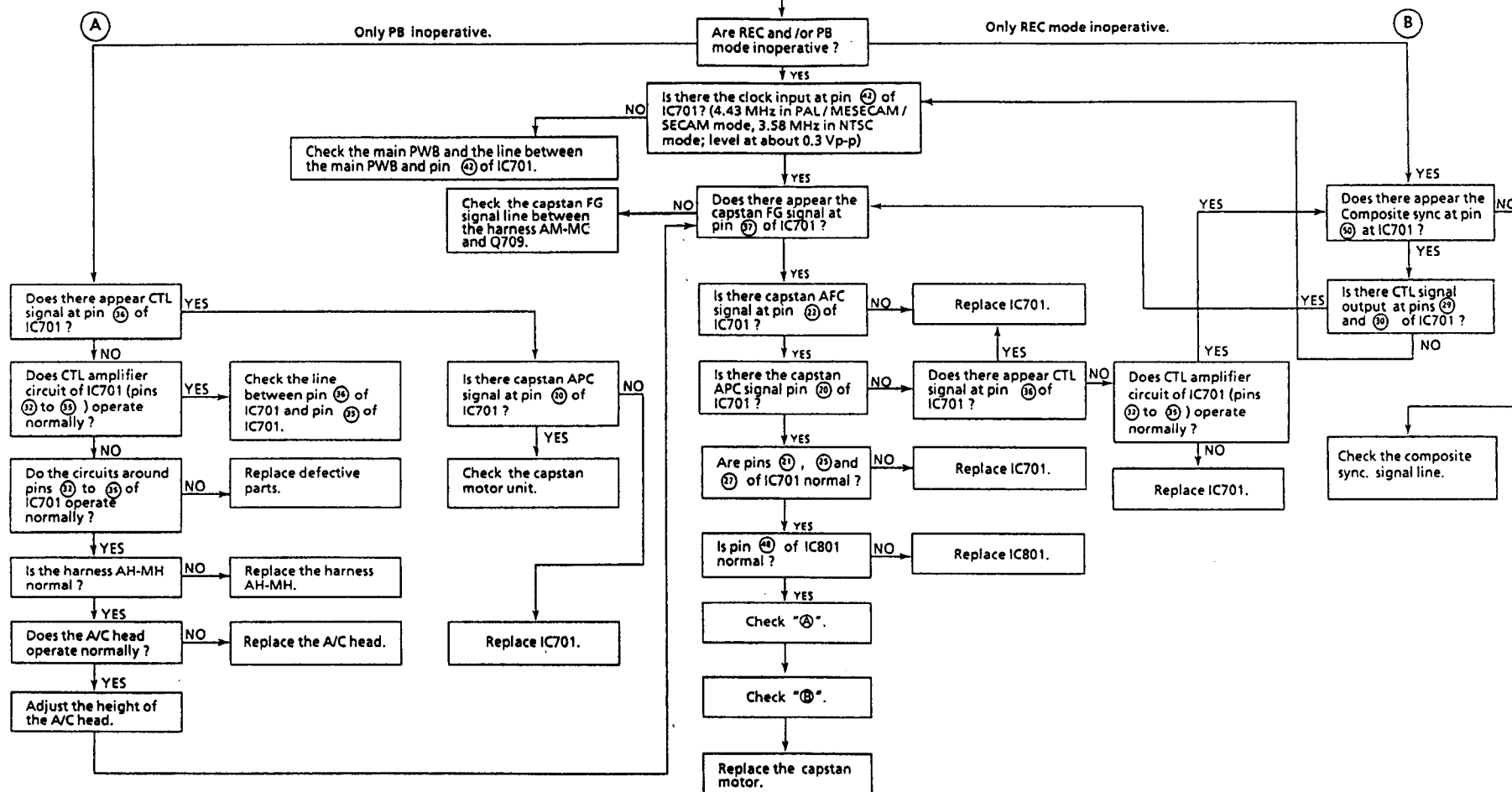
DRUM SERVO TROUBLESHOOTING

FLOW CHART NO. 10



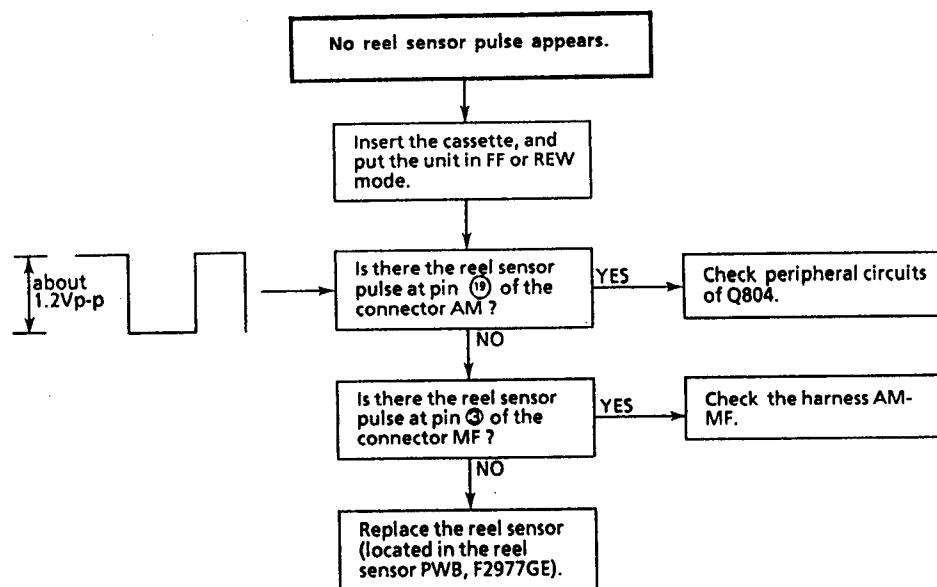
CAPSTAN SERVO TROUBLESHOOTING

FLOW CHART NO. 11



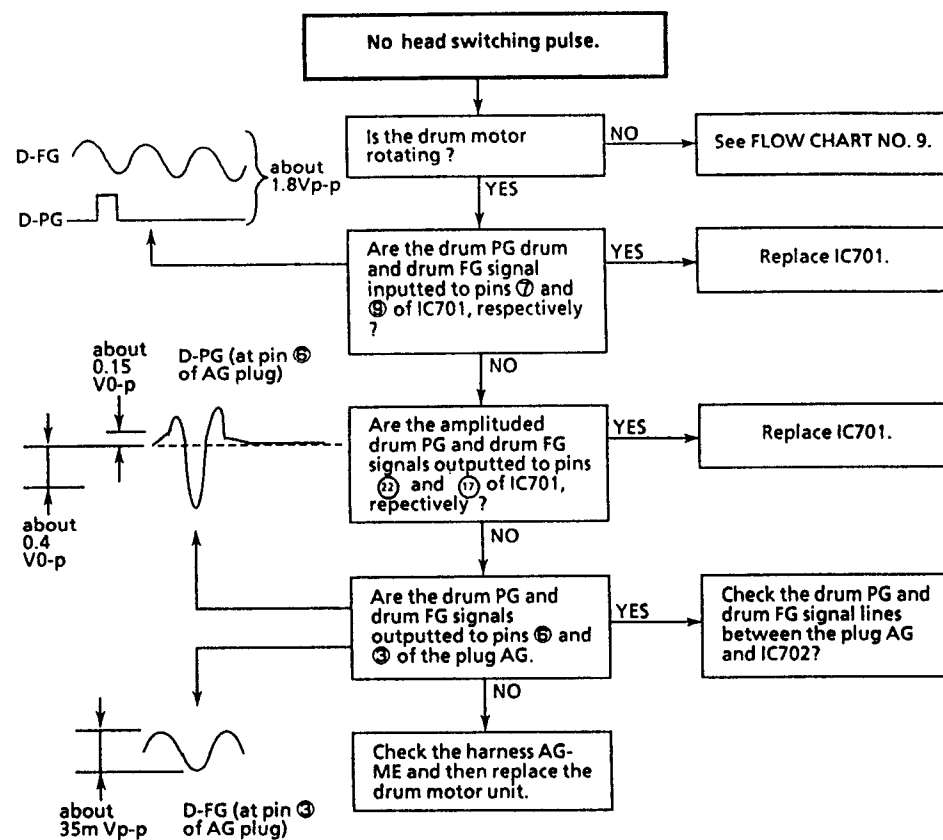
TAKE-UP REEL PULSE GENERATOR TROUBLESHOOTING

FLOW CHART NO. 12



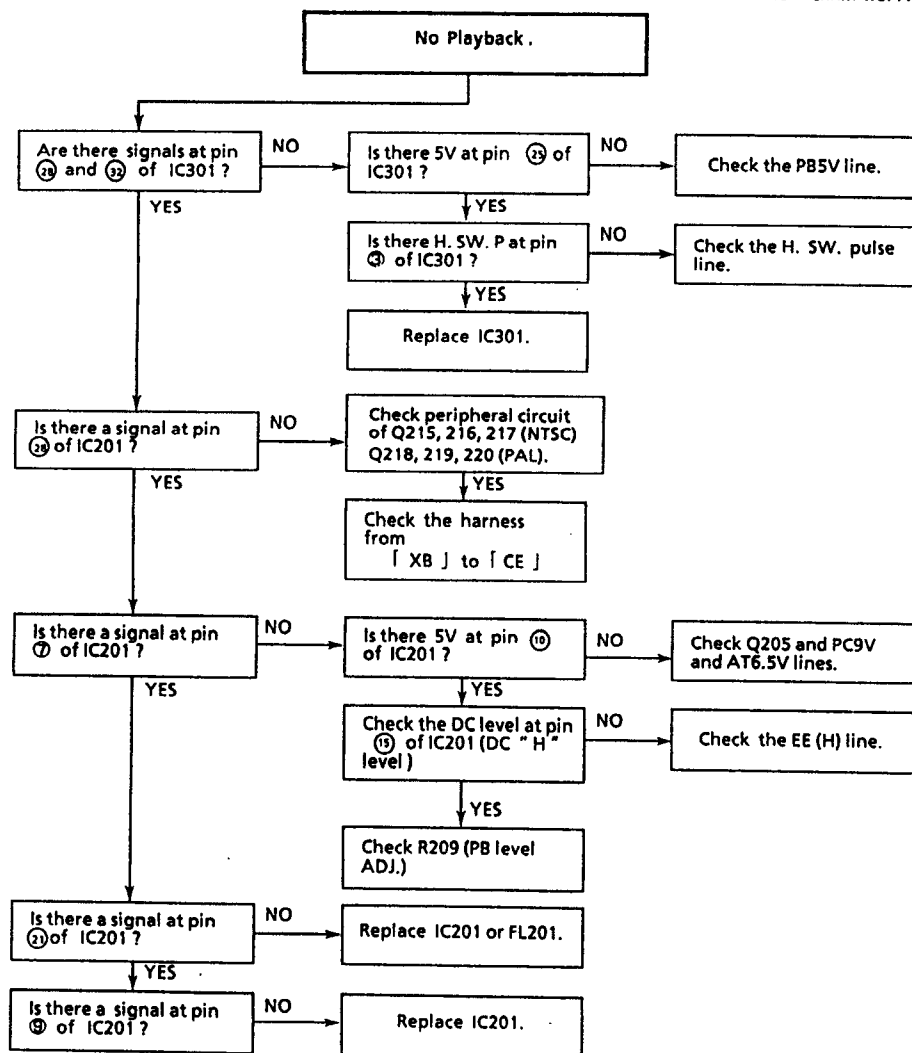
HEAD SWITCHING PULSE TROUBLESHOOTING

FLOW CHART NO. 13



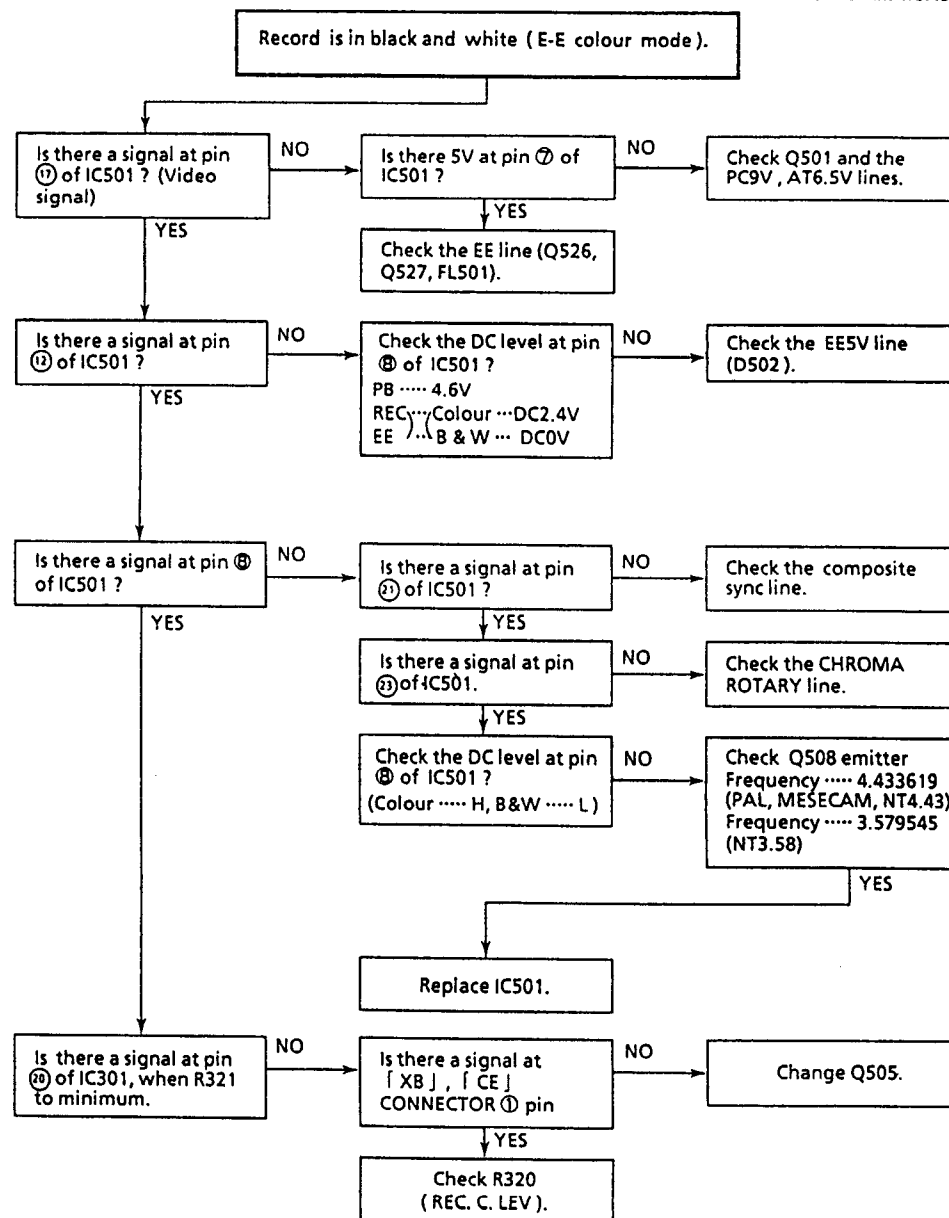
PLAYBACK MODE (LUMINANCE) TROUBLESHOOTING

FLOW CHART NO. 14



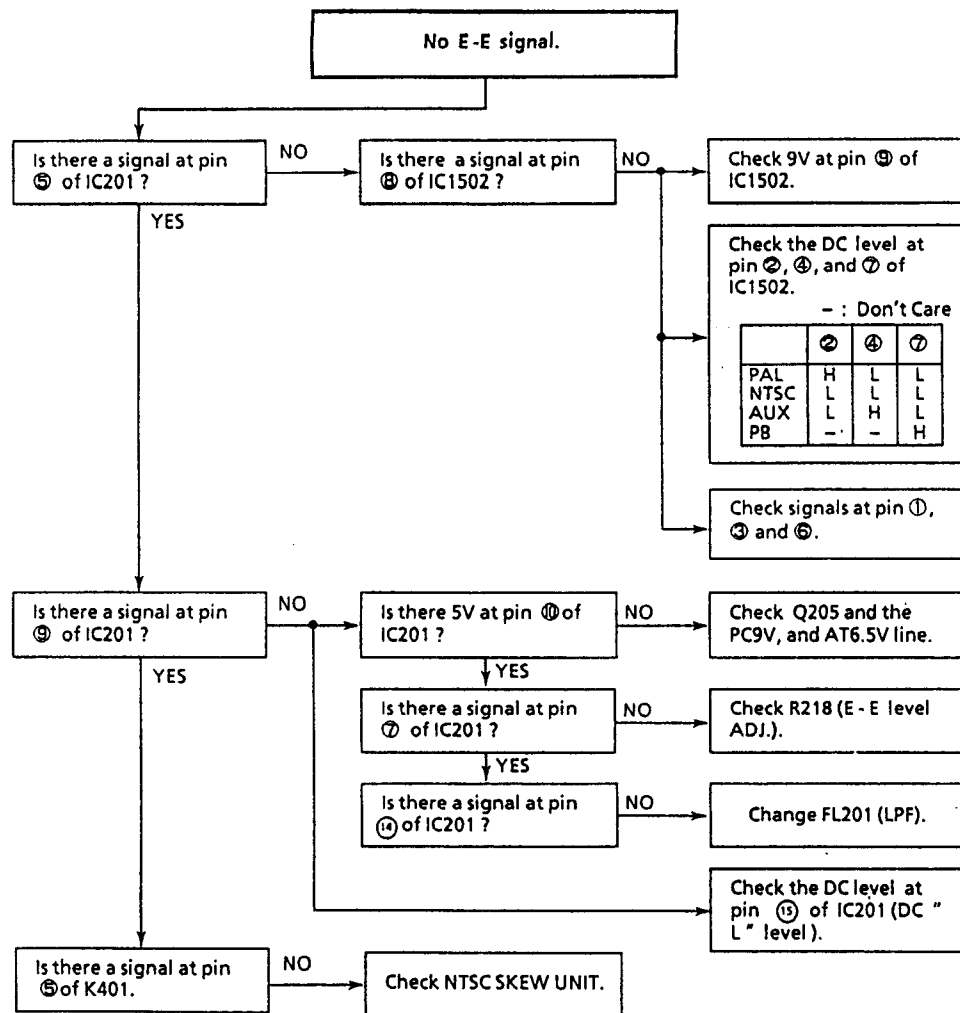
RECORDING MODE PAL, NTSC, MESECAM (CHROMA) TROUBLESHOOTING

FLOW CHART NO. 15



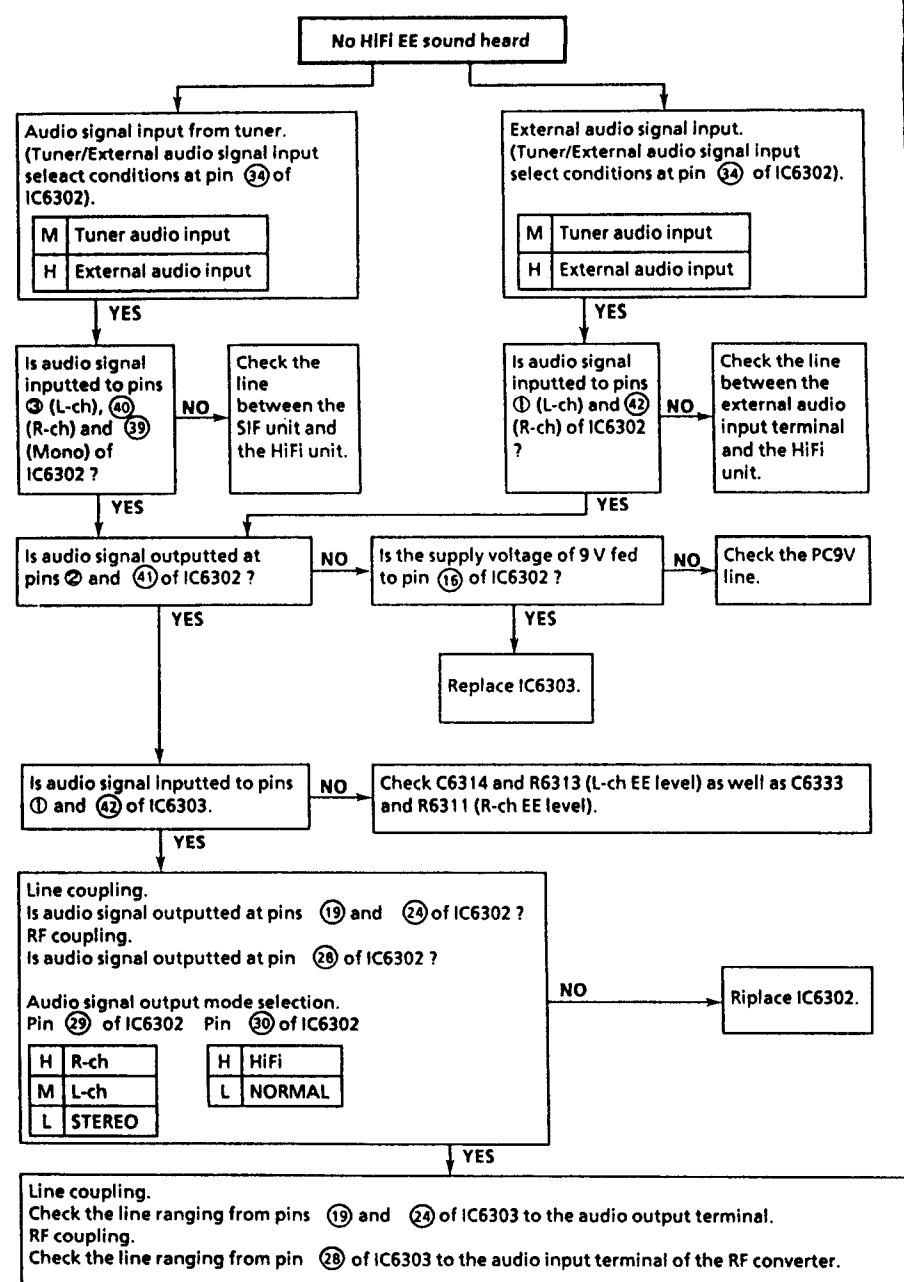
E - E MODE TROUBLESHOOTING

FLOW CHART NO. 18



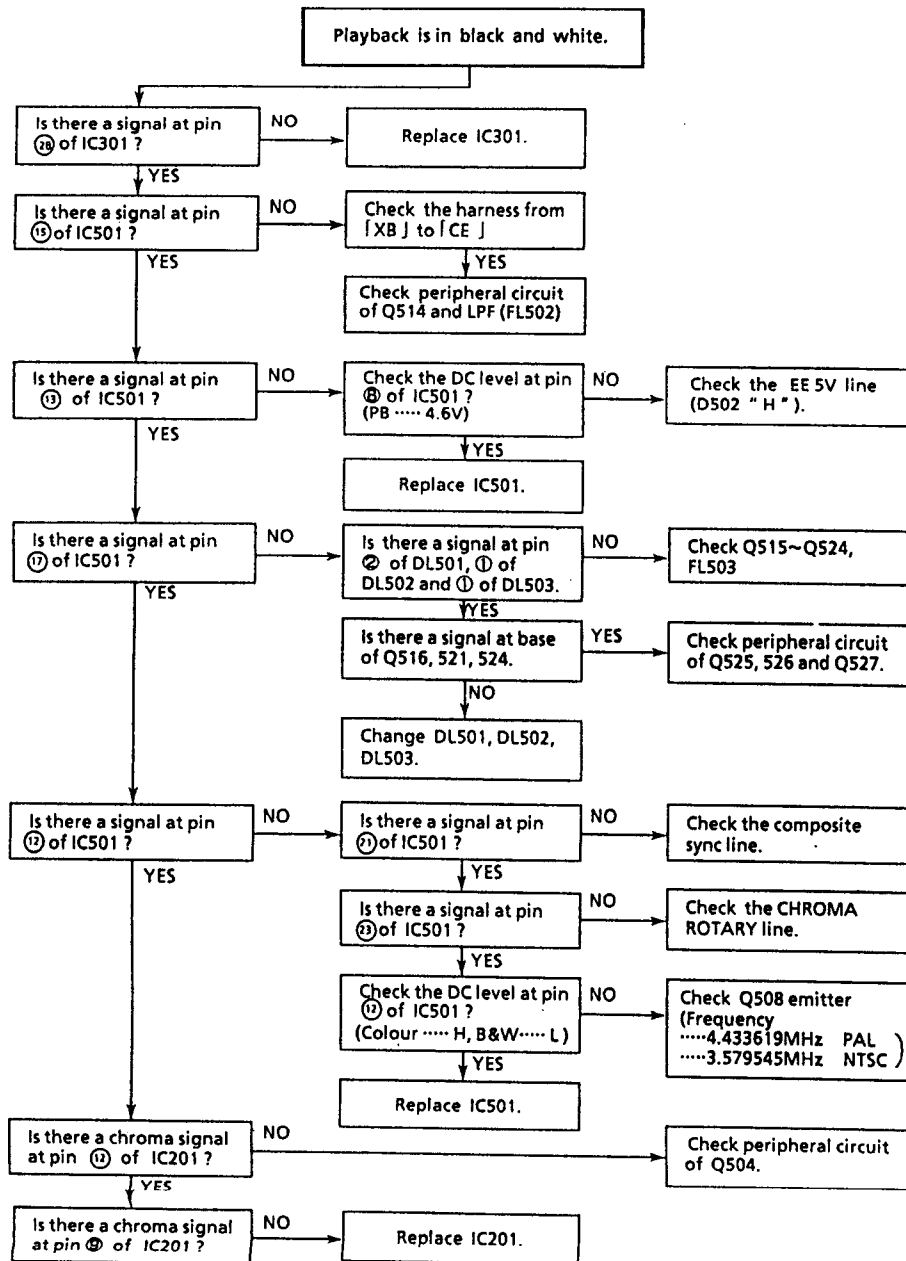
HiFi TROUBLESHOOTING (1)

FLOW CHART NO. 19



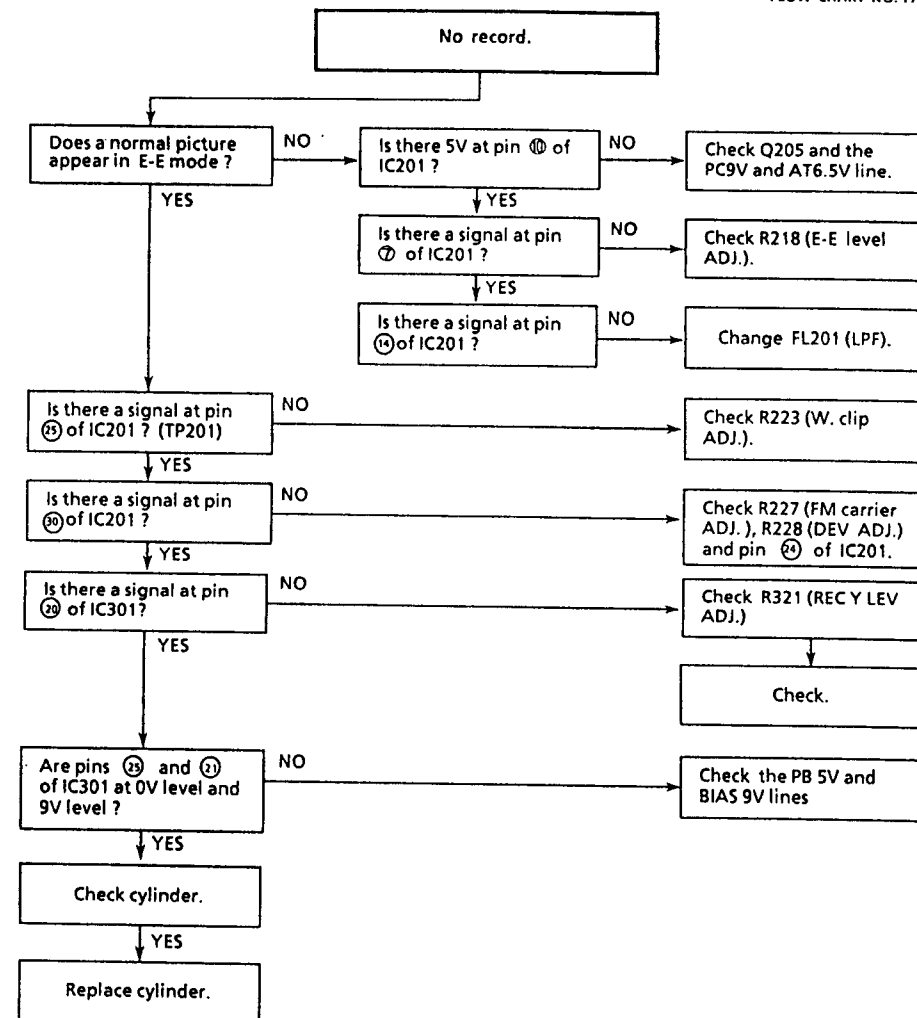
PLAYBACK MODE PAL, NTSC, MESECAM (CHROMA) TROUBLESHOOTING

FLOW CHART NO. 16

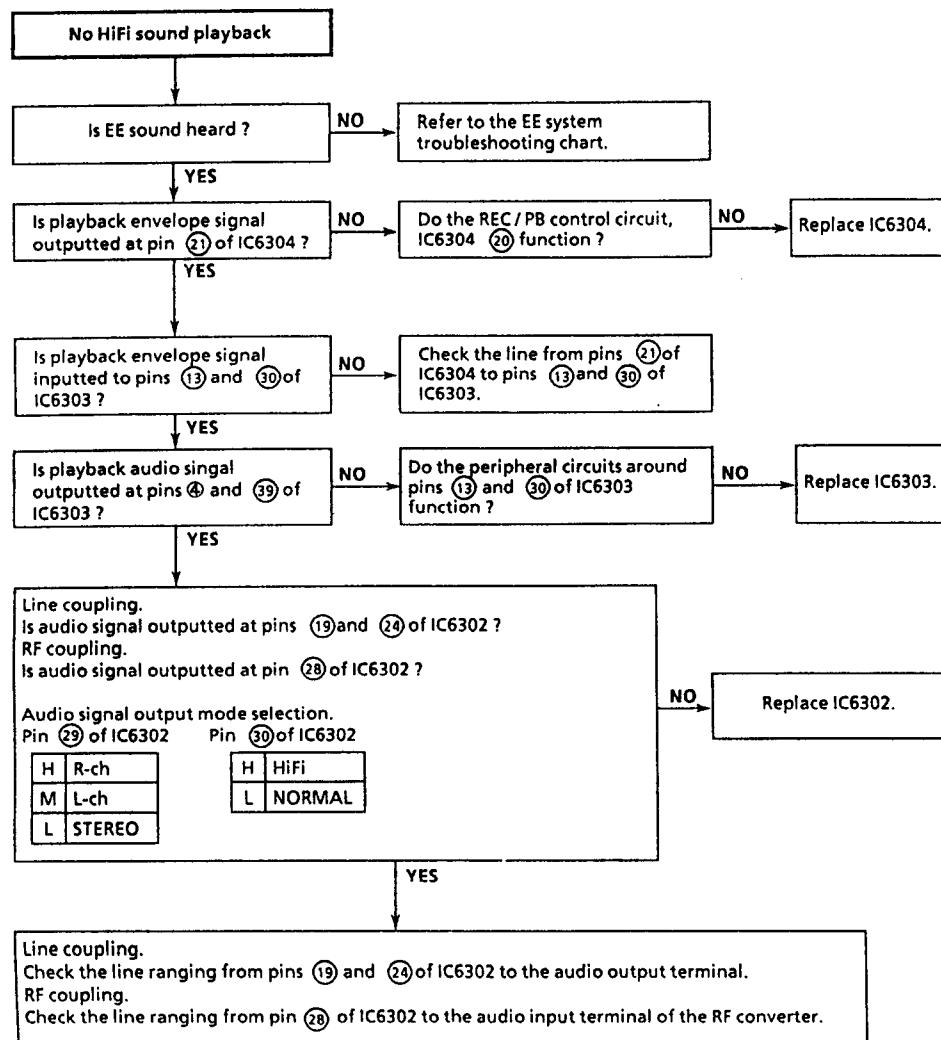


RECORDING MODE (LUMINANCE) TROUBLESHOOTING

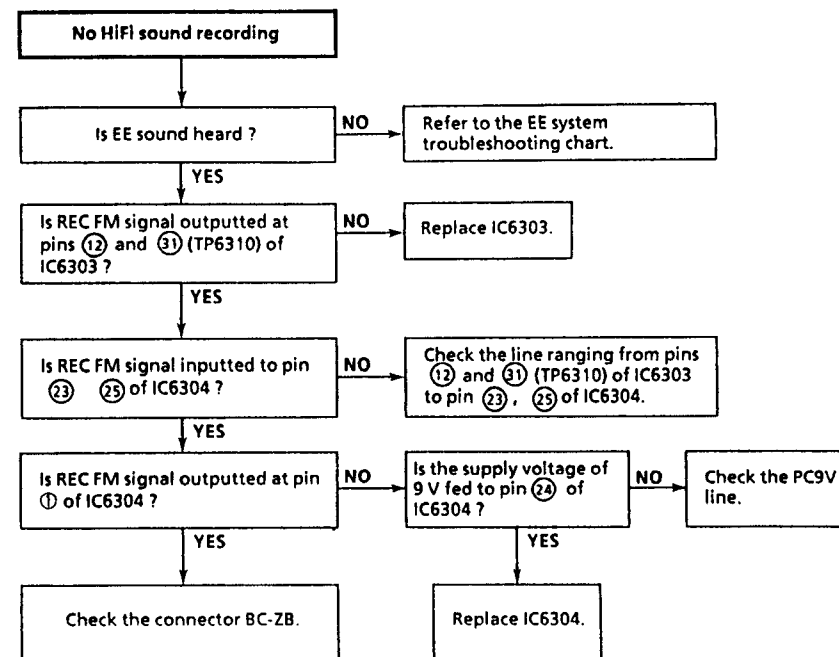
FLOW CHART NO. 17



HiFi TROUBLESHOOTING (2)

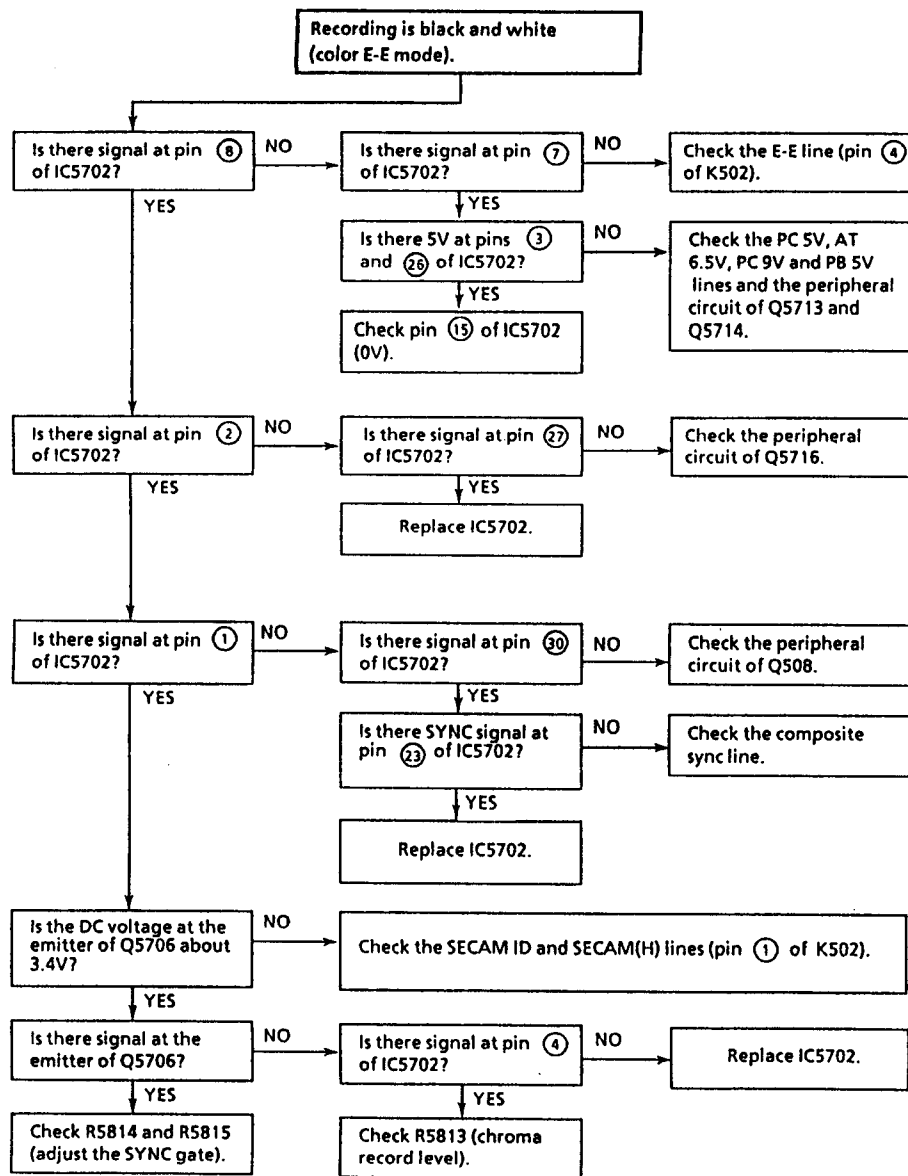


HiFi TROUBLESHOOTING (3)



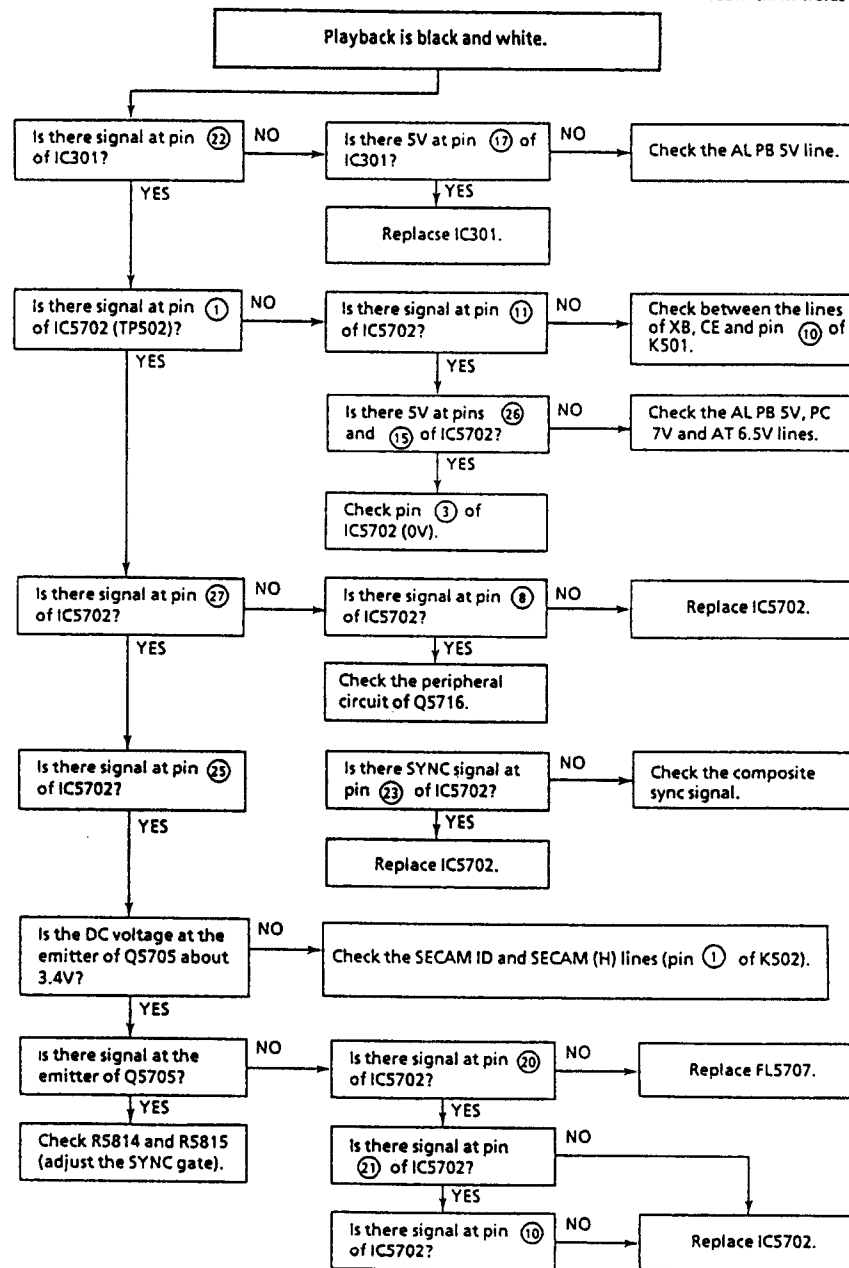
TROUBLESHOOTING IN RECORD MODE (SECAM CHROMA)

FLOW CHART NO. 22

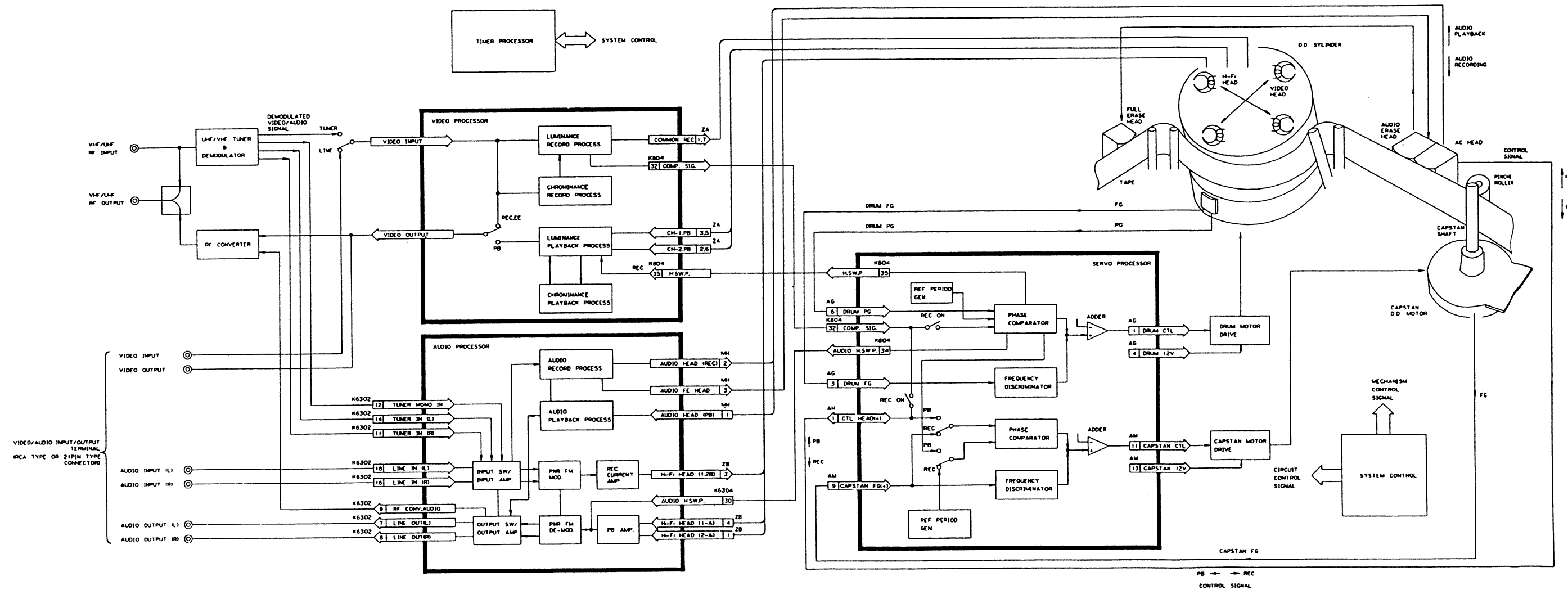


TROUBLESHOOTING IN PLAYBACK MODE (SECAM CHROMA)

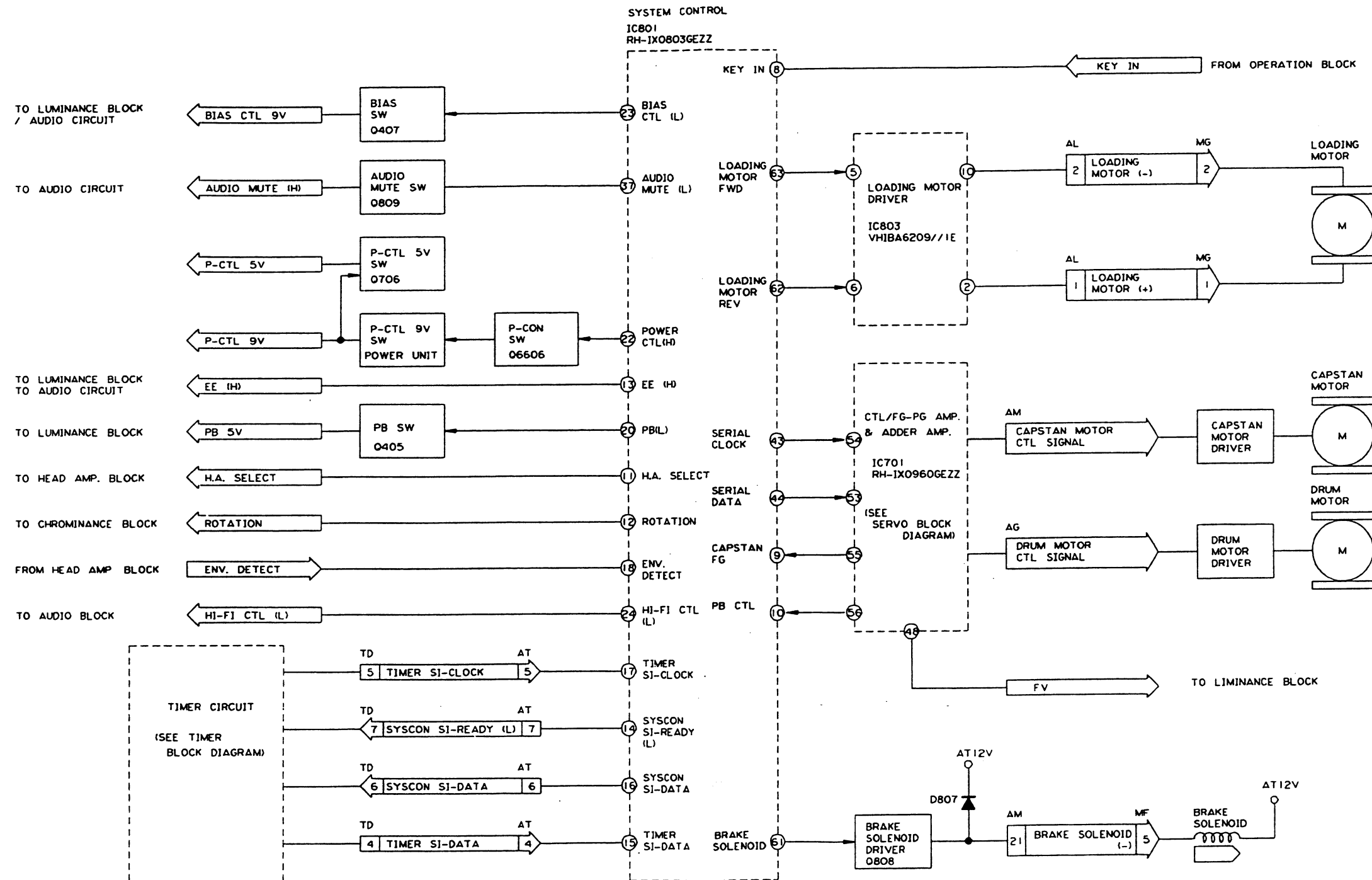
FLOW CHART NO. 23



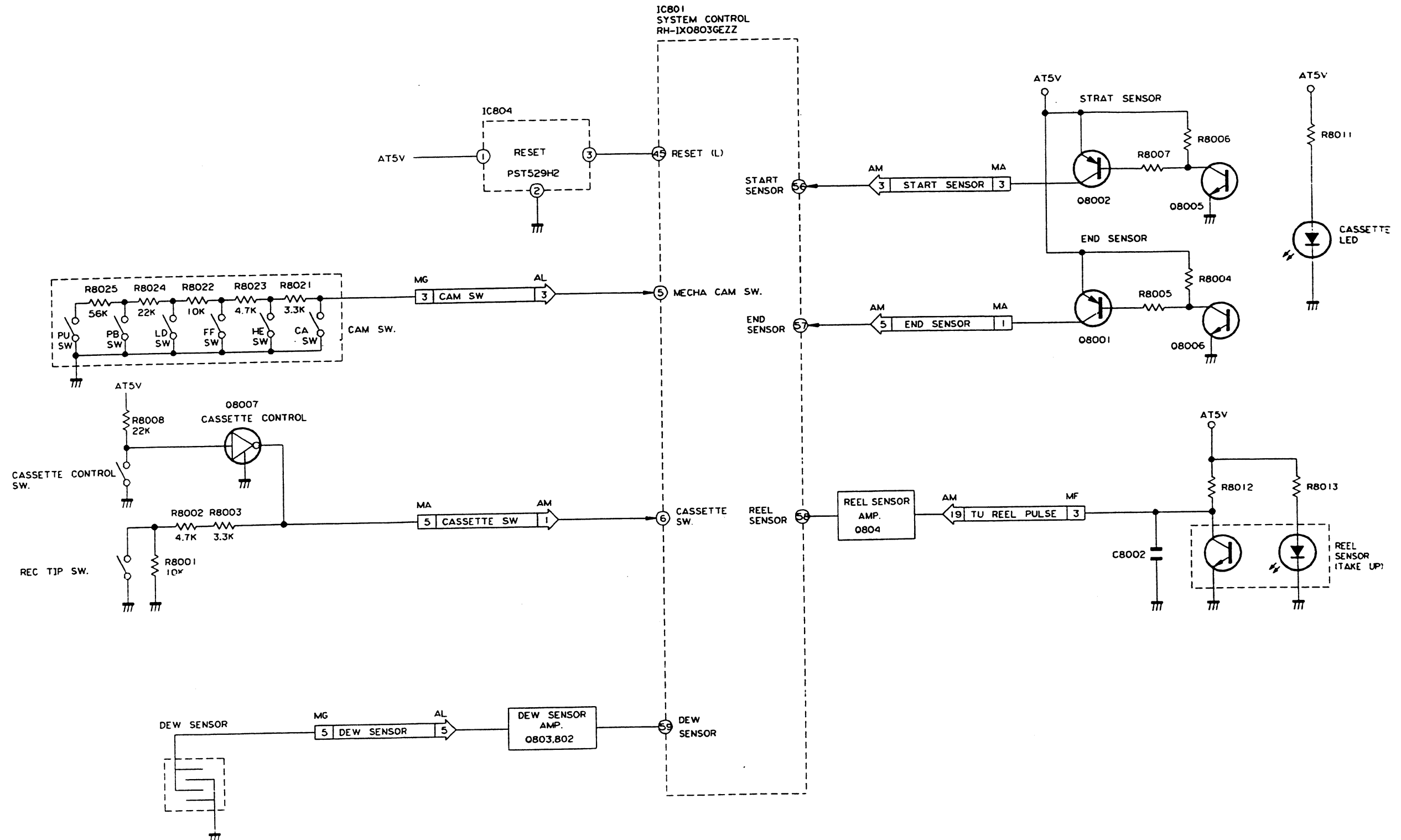
OVERALL BLOCK DIAGRAM



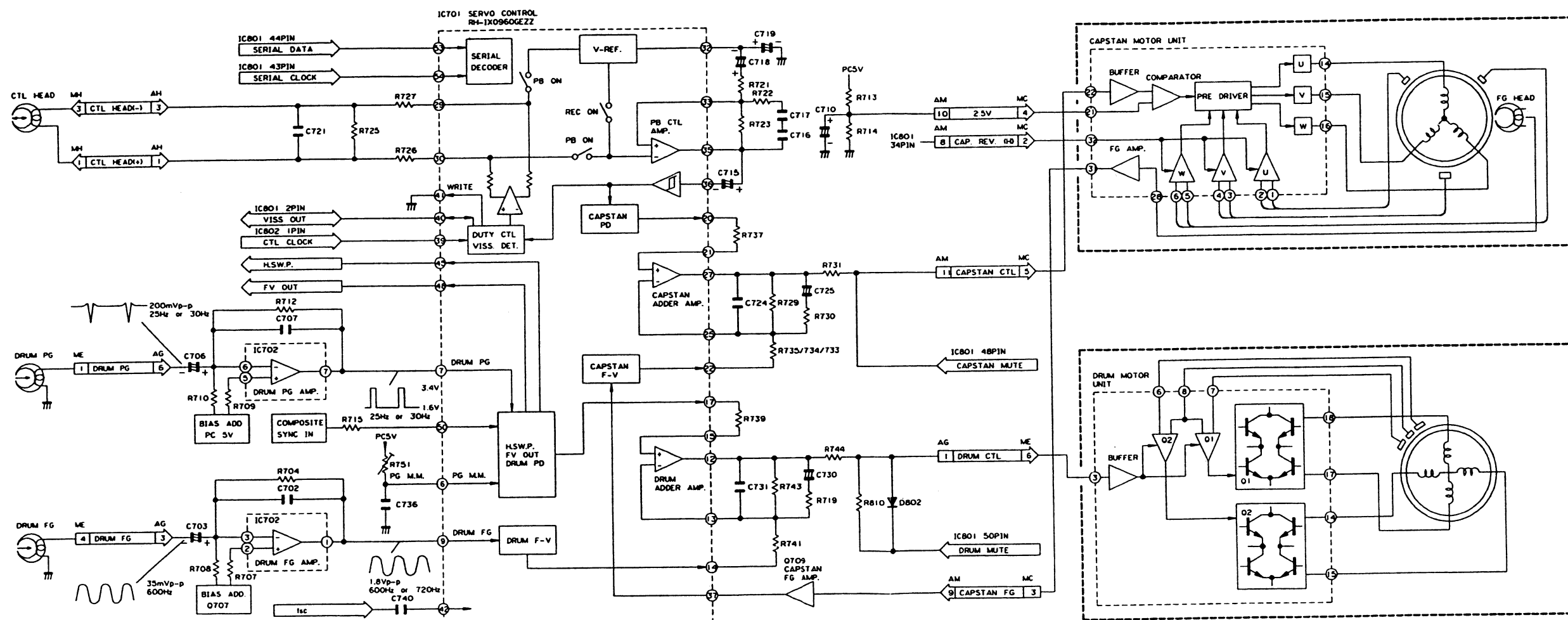
SYSTEM CONTROL BLOCK DIAGRAM



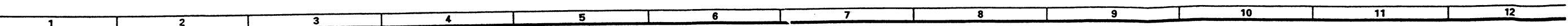
SAFETY DEVICE BLOCK DIAGRAM

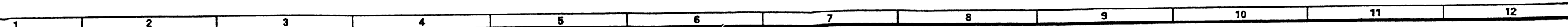


SERVO PROCESS BLOCK DIAGRAM

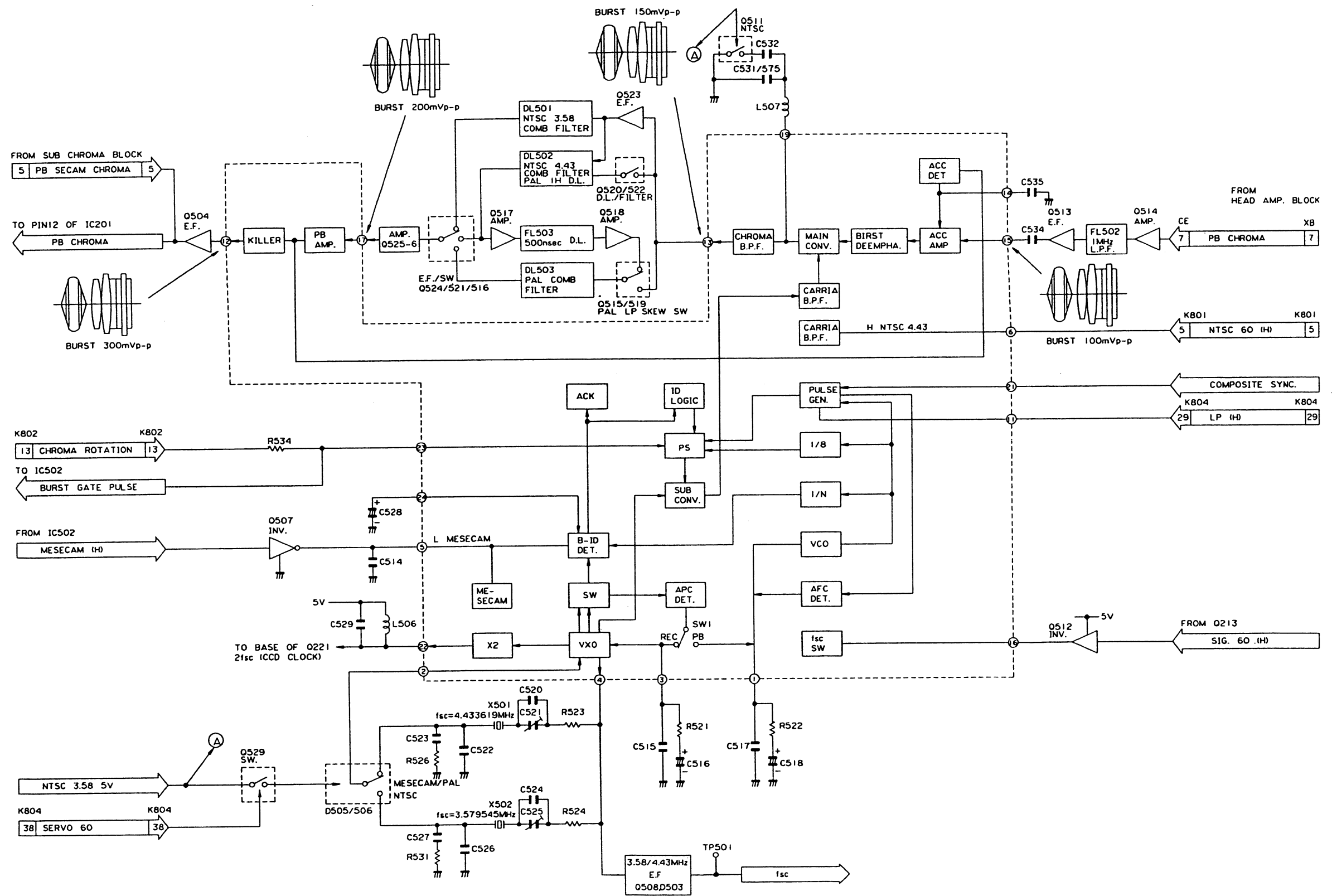


A
B
C
D
E
F

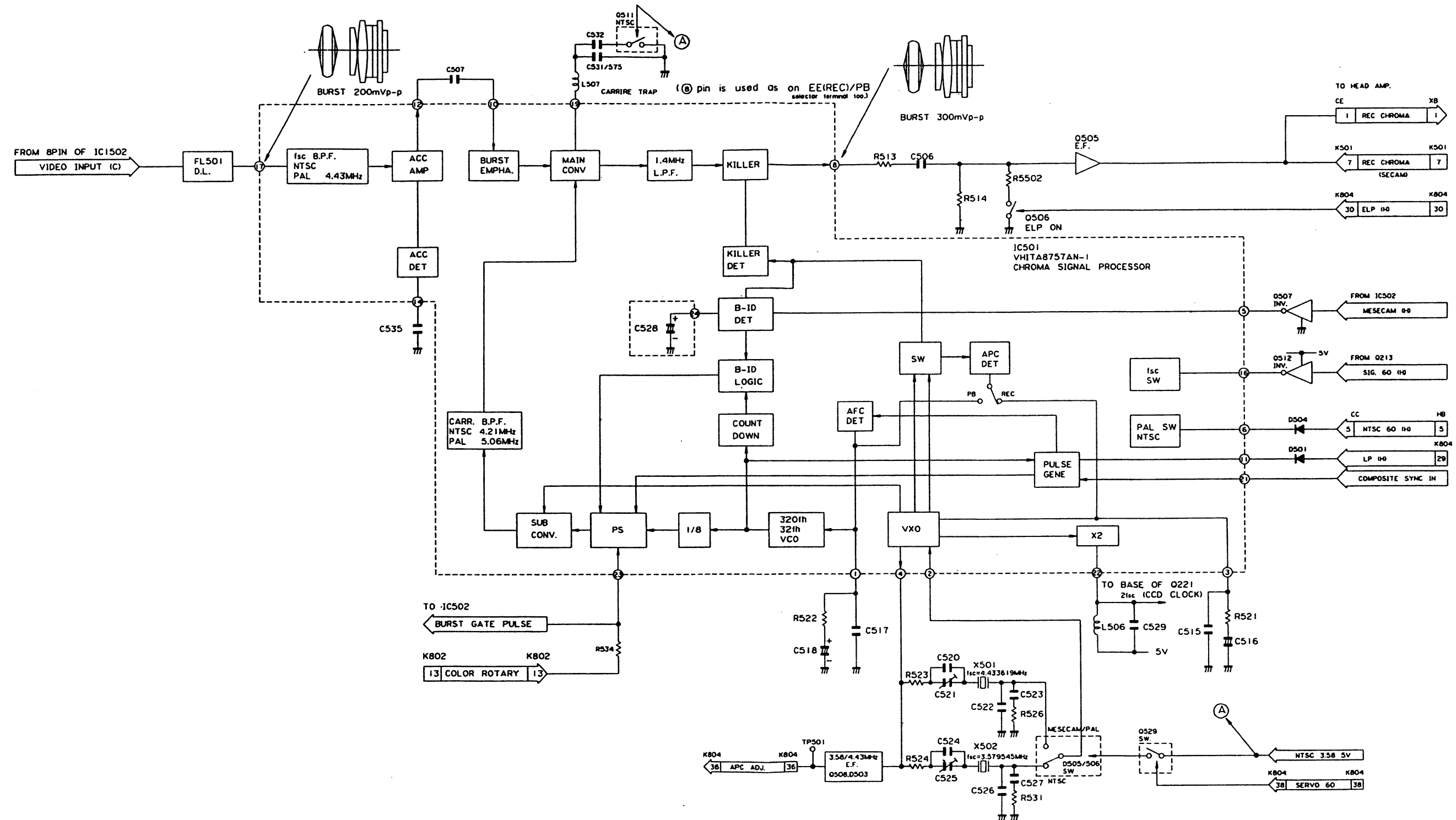




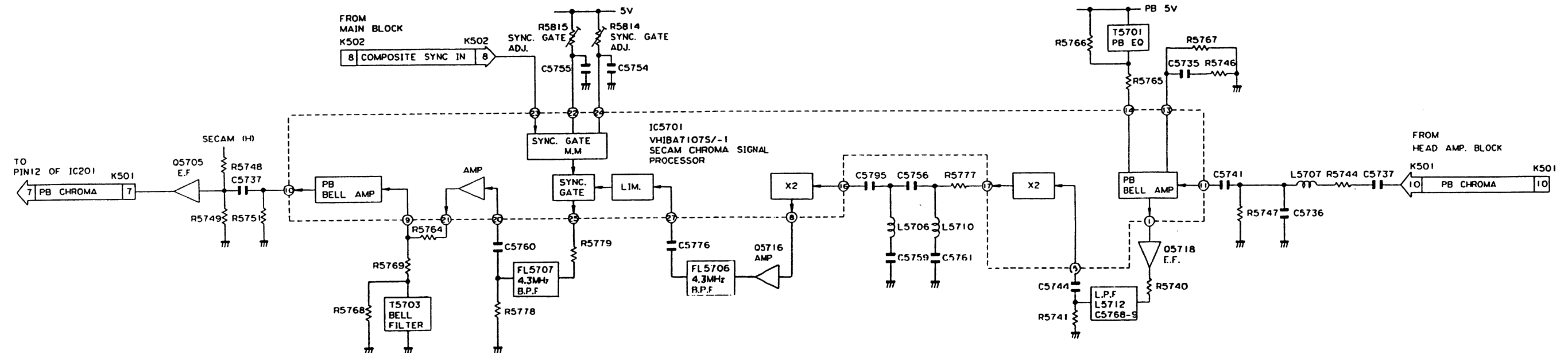
PLAYBACK CHROMINANCE BLOCK DIAGRAM



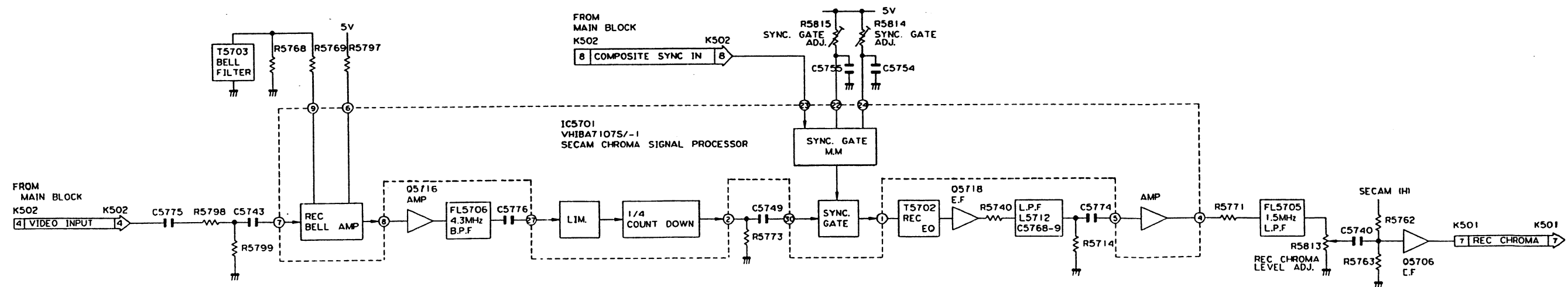
RECORDING CHROMINANCE BLOCK DIAGRAM



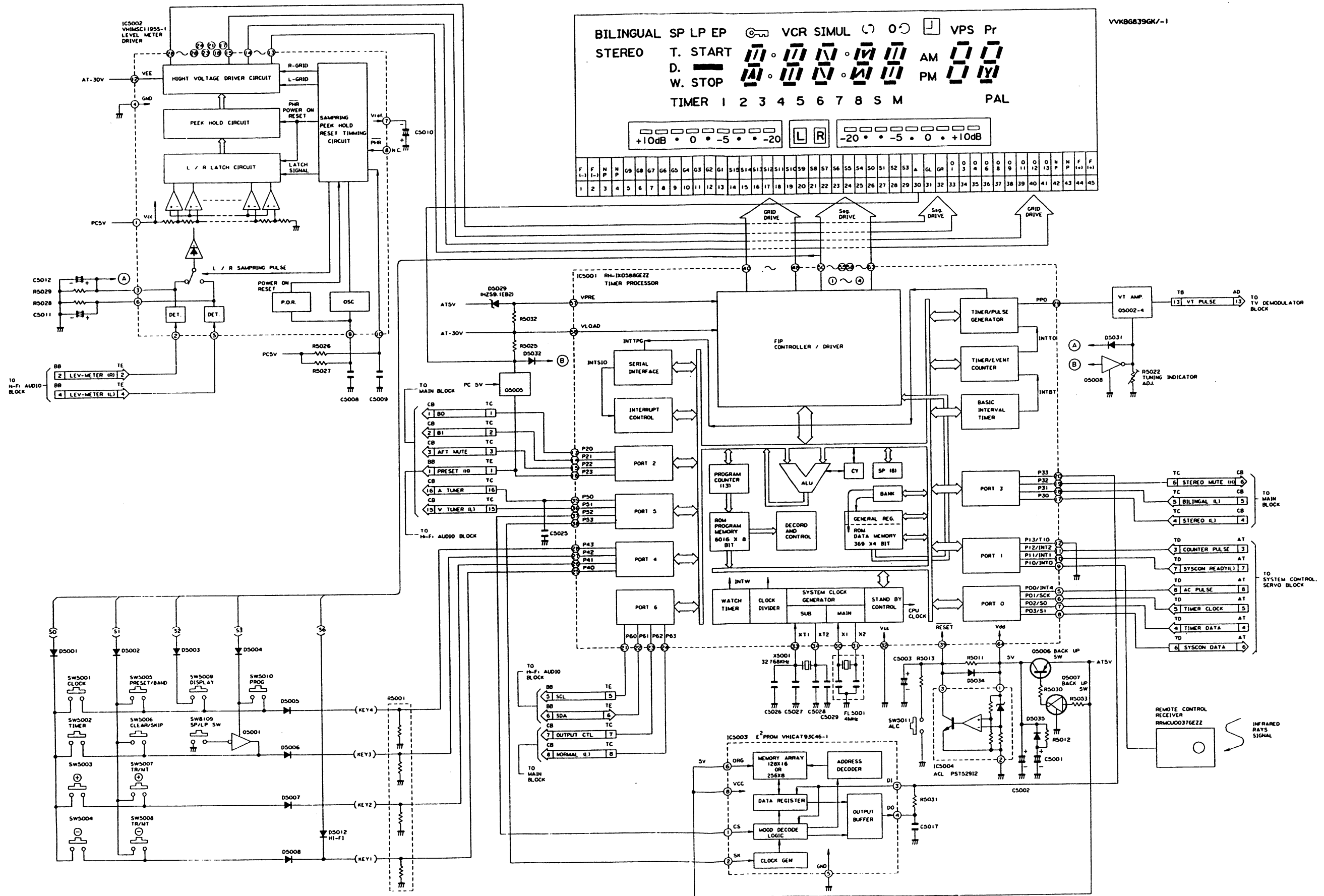
PLAYBACK SECAM CHROMINANCE BLOCK DIAGRAM



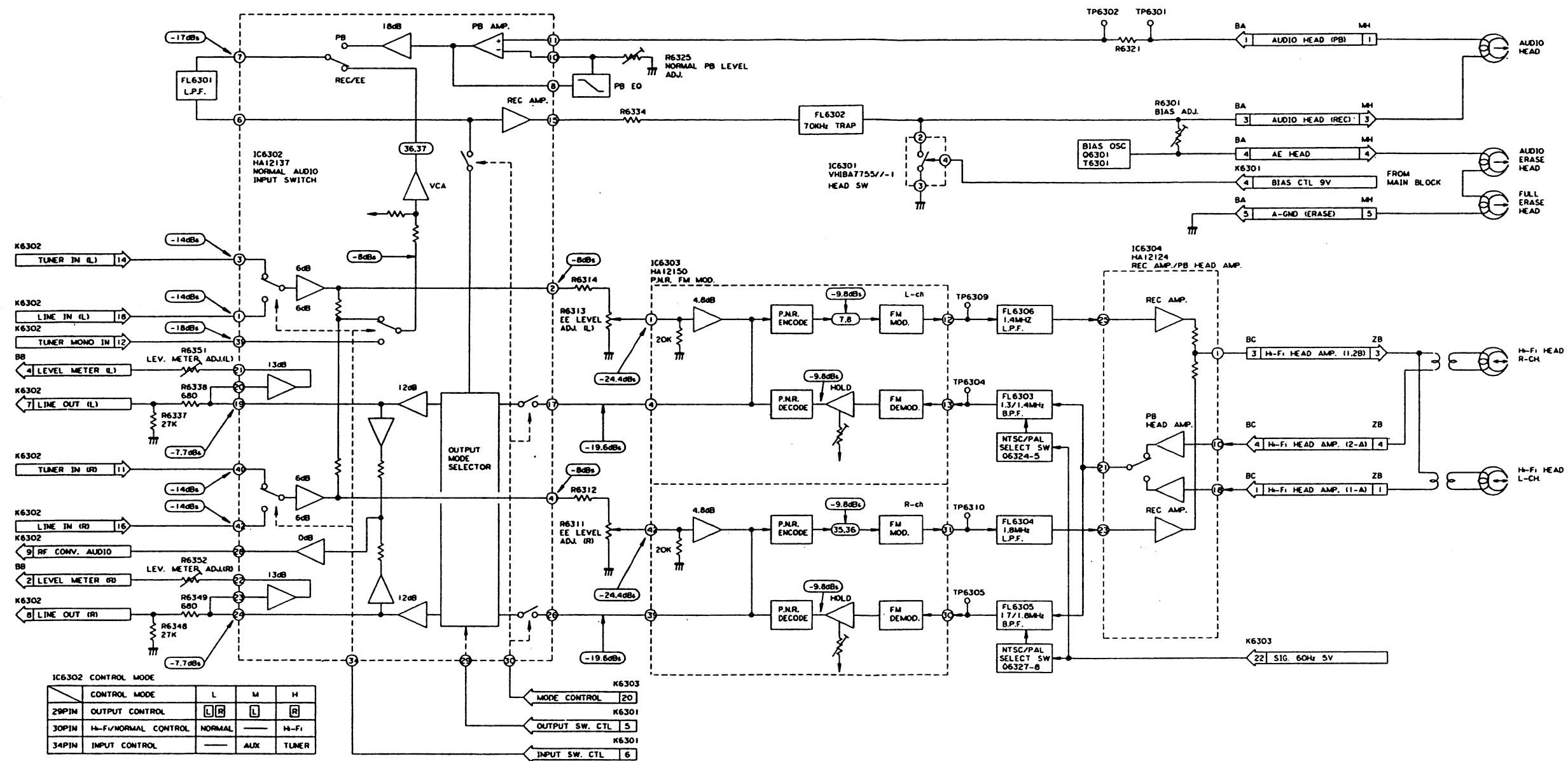
RECORDING SECAM CHROMINANCE BLOCK DIAGRAM



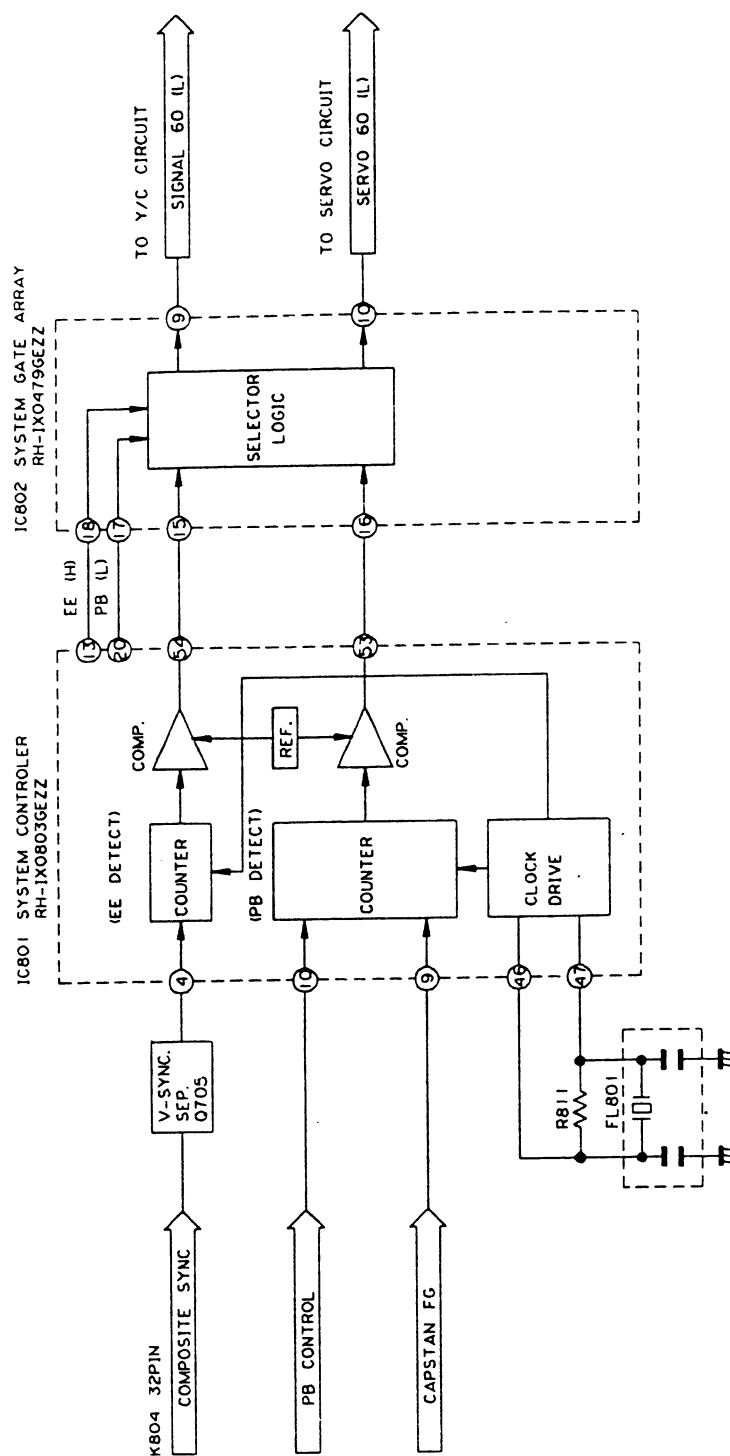
TIMER/LEVEL METER BLOCK DIAGRAM



HiFi AUDIO BLOCK DIAGRAM



50/60Hz DETECT SYSTEM BLOCK DIAGRAM



SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:

BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET. PARTS MARKED WITH "⚠" AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET. BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTES:

1. DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.
2. SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.

NOTES:

1. The unit of resistance "ohm" is omitted ($K = 1000 \text{ ohm}$, $M = 1 \text{ Meg ohm}$).
2. All resistors are 1 / 8 watt, unless otherwise noted.
3. The unit of capacitance "F" is omitted ($\mu = \mu F$, $p = p \mu F$).
4. The values in parentheses are the ones in the PB mode; the values without parentheses are the ones in the REC mode.

VOLTAGE MEASUREMENT CONDITIONS:

1. DC voltages are measured between points indicated and chassis ground by VTVM, with AC110~240V, 50/60Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.
2. Voltages are measured with 10000 μV B & W or colour signal.

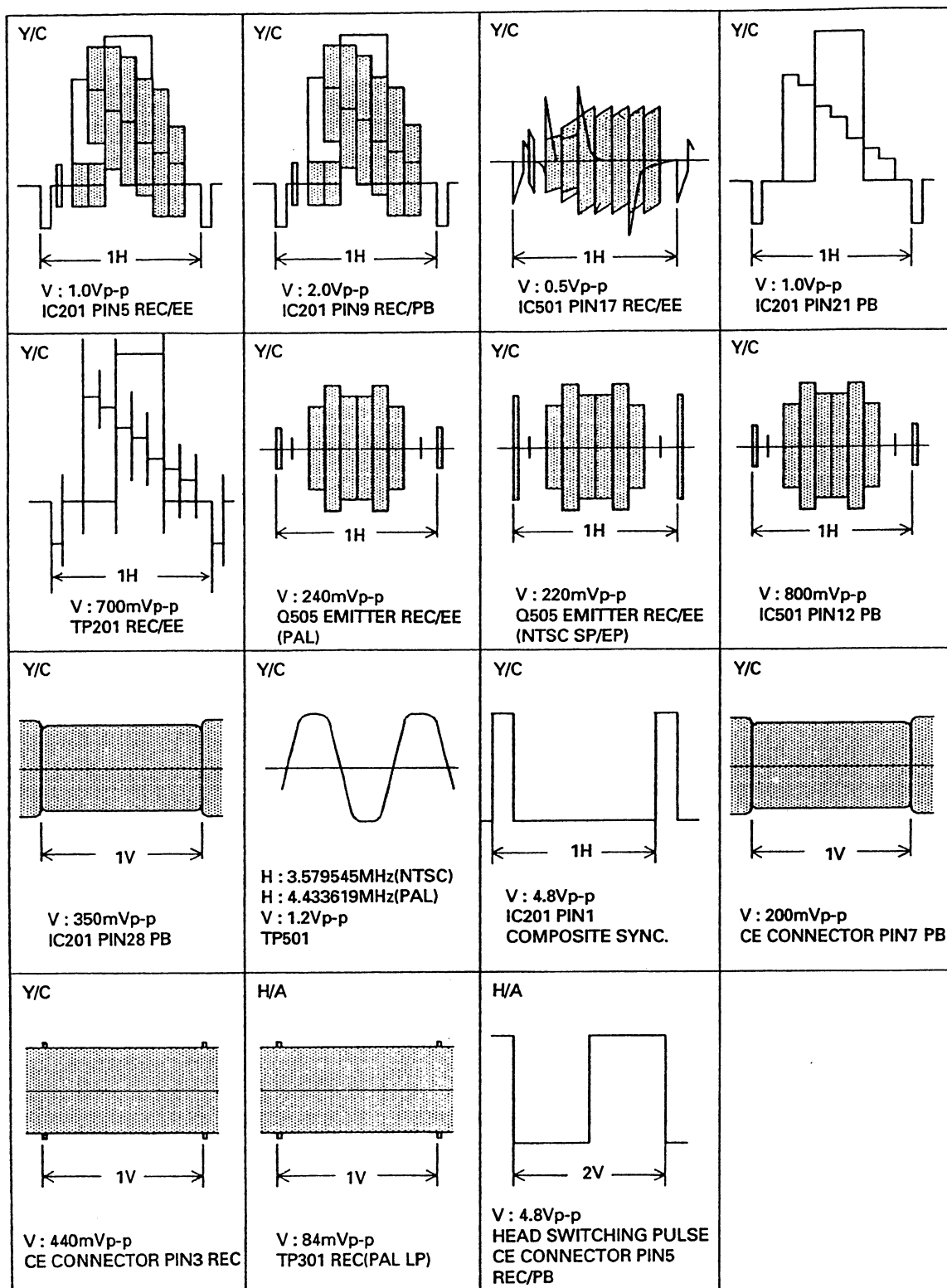
WAVEFORM MEASUREMENT CONDITIONS:

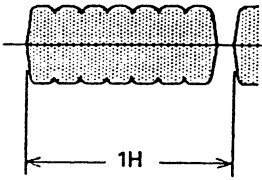
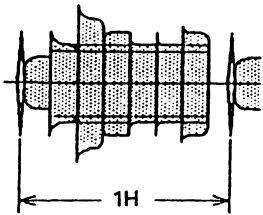
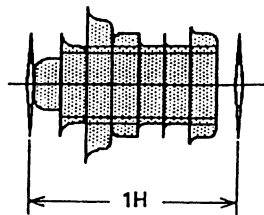
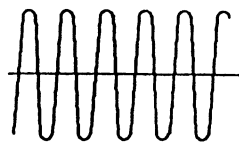
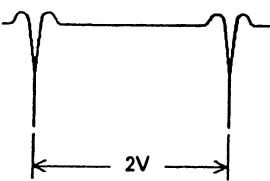
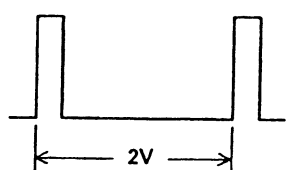
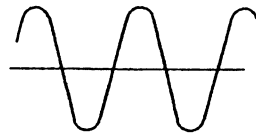
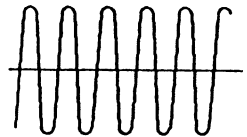
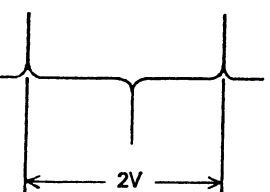
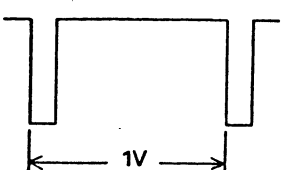
10000 μV 87.5 percent modulated colour bar signal is fed into tuner.

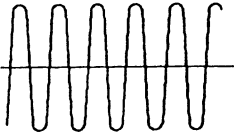
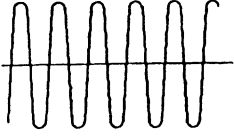
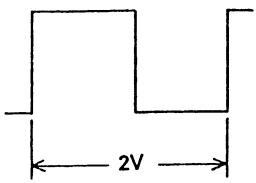
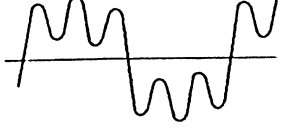
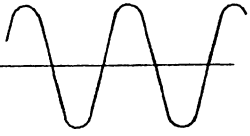
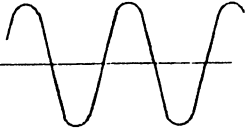
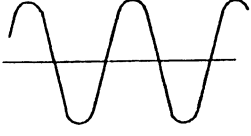
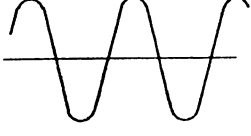
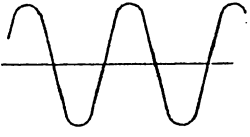
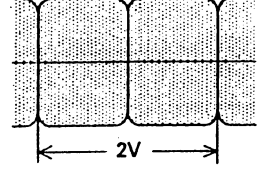
CAUTION:

This circuit diagram is original one. Therefore there may be a slight difference from yours.

WAVE FORMS



<p>SUB CHROMA</p>  <p>V : 1.0Vp-p IC5702 PIN27 REC/EE</p>	<p>SUB CHROMA</p>  <p>V : 100mVp-p Q5706 EMITTER REC/EE</p>	<p>SUB CHROMA</p>  <p>V : 320mVp-p IC5702 PIN10 PB</p>	<p>SERVO</p>  <p>H : 3.58MHz(NTSC) H : 4.43MHz(PAL) V : 0.3Vp-p IC701 PIN42 REC/PB</p>
<p>SERVO</p>  <p>V : 0.4Vp-p AG CONNECTOR PIN6 PB</p>	<p>SERVO</p>  <p>V : 2.0Vp-p IC701 PIN7 REC/PB</p>	<p>SERVO</p>  <p>H : 720Hz(NTSC) H : 600Hz(PAL) V : 1.9Vp-p IC701 PIN 9 PB</p>	<p>SERVO</p>  <p>H : 1080Hz(NTSC SP) H : 757Hz(PAL SP) V : 1.7Vp-p AM CONNECTOR PIN9</p>
<p>SERVO</p>  <p>V : 3.2Vp-p (SP MODE) IC701 PIN36 PB</p>	<p>SERVO</p>  <p>V : 5.0Vp-p IC801 PIN4 EE(REC)</p>		

<p>AUDIO (NORMAL REC SIGNAL)</p>  <p>H : 70±5KHz V : 7.35mVp-p TP6301(+), TP6302(-) REC</p>	<p>AUDIO (ERASE VOLTAGE)</p>  <p>H : 70±5KHz V : 70Vp-p BA CONNECTOR PIN4~PIN5 REC</p>	<p>AUDIO (HEAD SW PULSE)</p>  <p>V : 5.0Vp-p K6304 PIN30 REC/PB</p>	<p>AUDIO (REC FM SIGNAL)</p>  <p>H : 32μsec (0.2μsec/div) V : 1.5Vp-p TP6309,6310 REC/EE</p>
<p>AUDIO (INPUT SIGNAL)</p>  <p>H : 1KHz V : 420mVp-p K6302 PIN11 TUNER IN(R) K6302 PIN14 TUNER IN(L) K6302 PIN16 LINE IN(R) K6303 PIN18 LINE IN(L) REC/EE</p>	<p>AUDIO (OUTPUT SIGNAL)</p>  <p>H : 1KHz V : 920mVp-p K6302 PIN8 LINE OUT(R) K6303 PIN7 LINE OUT(L) K6302 PIN9 RF CONV. IN REC/EE/PB</p>	<p>AUDIO (NORMAL PB SIGNAL)</p>  <p>H : 1KHz V : 290mVp-p IC6302 PIN7 PB</p>	<p>AUDIO (Hi-Hi AUD. SIGNAL)</p>  <p>H : 1KHz V : 210mVp-p IC6303 PIN39 (R) IC6303 PIN4 (L) REC/PB/EE</p>
<p>AUDIO (INPUT SIGNAL)</p>  <p>H : 1KHz V : 260mVp-p K6302 PIN12 TUNER MONO INPUT REC/EE</p>	<p>AUDIO (PB FM B.P.F. OUT)</p>  <p>H : 20msec V : 100mVp-p PB TP6305(R), TP6304(L)(SIG) TP6306 GND (R-CH), +5V(L-CH)</p>		

This image shows a full page of a document template designed for handwritten notes or essays. It features approximately 28 evenly spaced horizontal dotted lines across the entire width of the page, providing a guide for letter height and placement. The background is plain white, and there are no margins, headers, or footers visible.

MECHA & SYSCON SERVO CIRCUIT

Drum Error Voltage

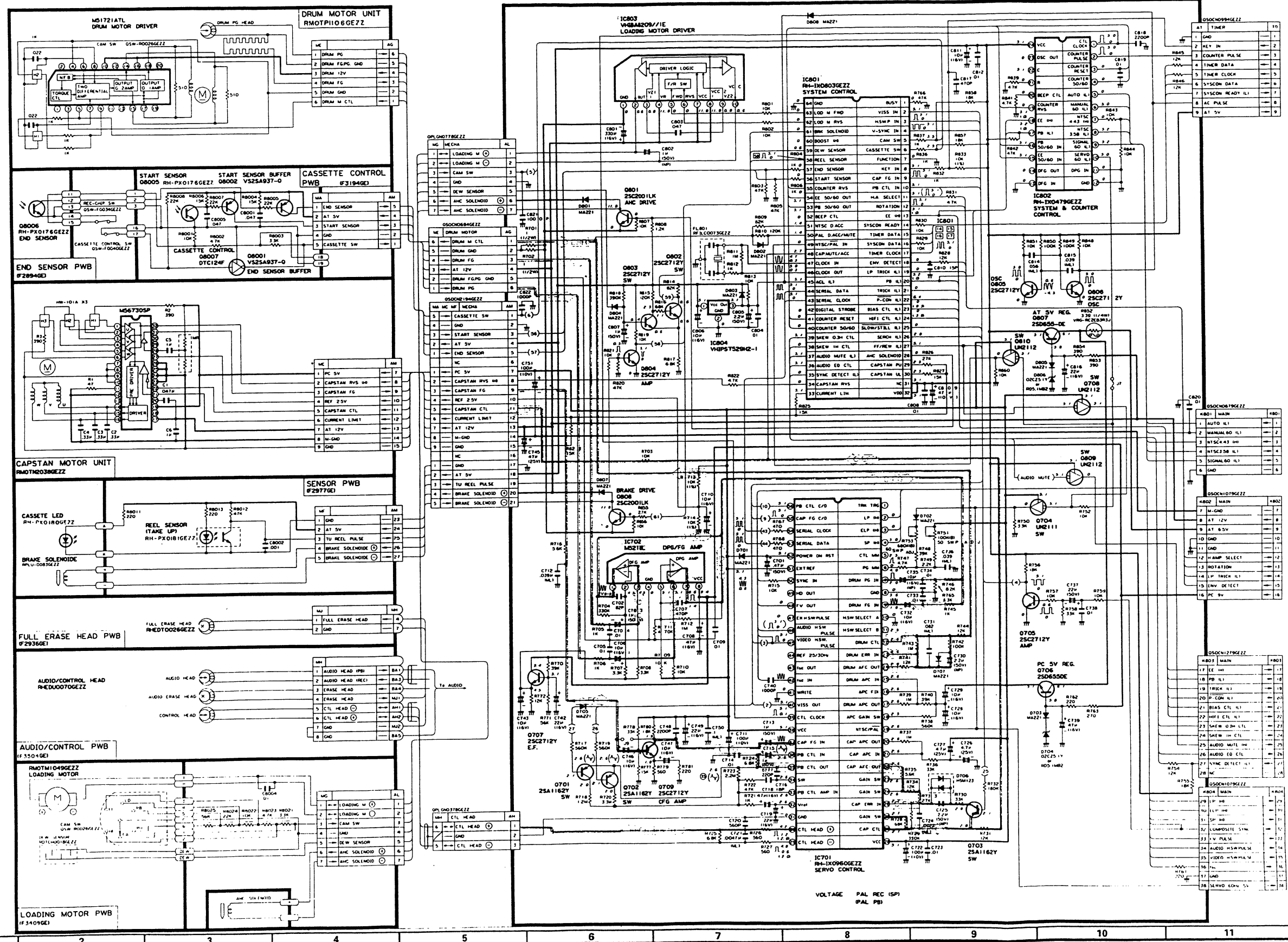
Drum Frequency Comparison Signal

Drum Phase Comparison Signal

Capstan Error Voltage

Capstan Frequency Comparison Signal

Playback Control Comparison Signal



VC-90ET

VC-90ET

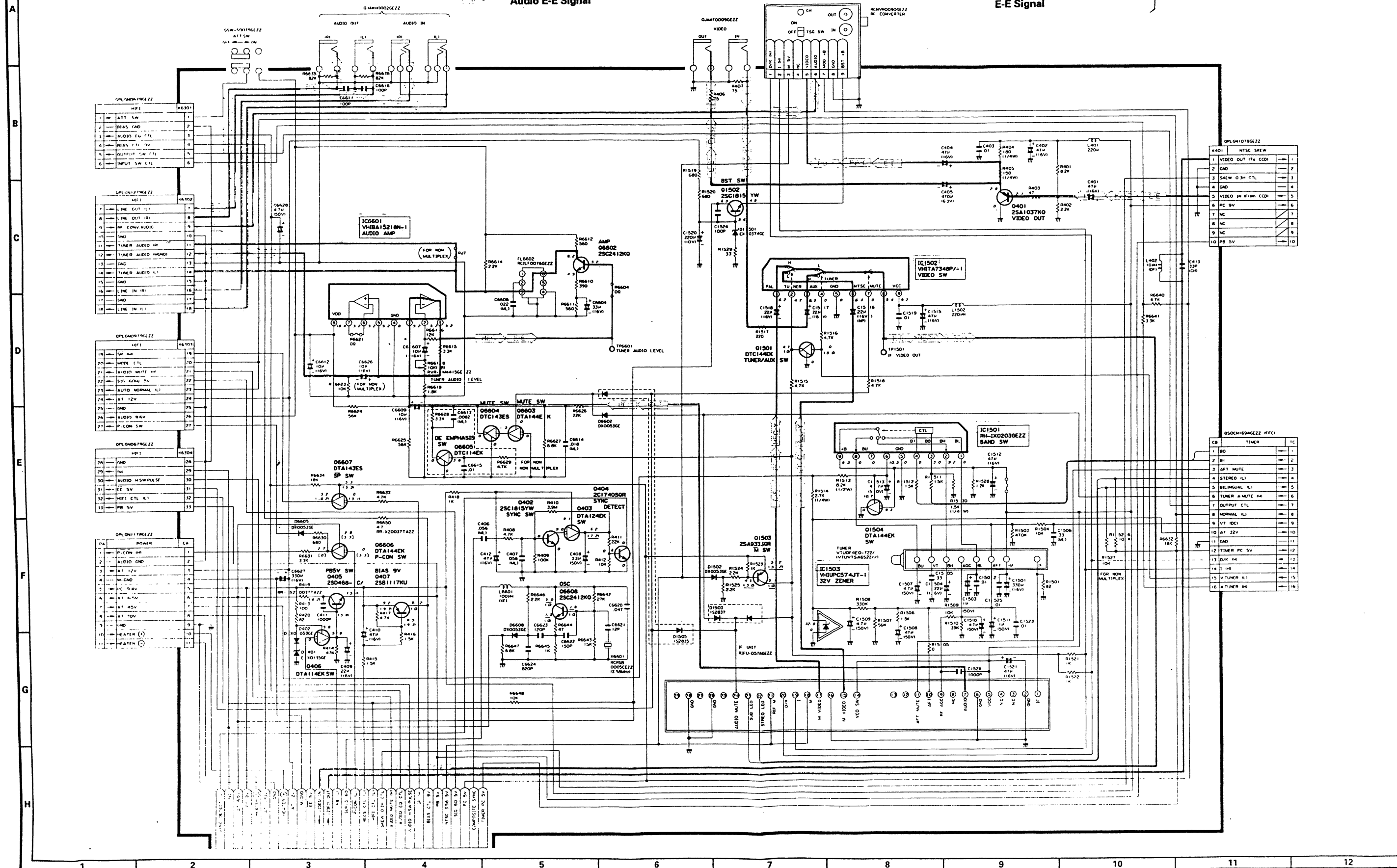
MAIN CIRCUIT (1)

Audio Playback Signal
Audio Recording Signal
Audio E-E Signal

Playback Luminance Signal
Playback Chrominance Signal

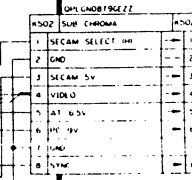
Recording Luminance Signal
Recording Chrominance Signal
E-E Signal

VideoSignal

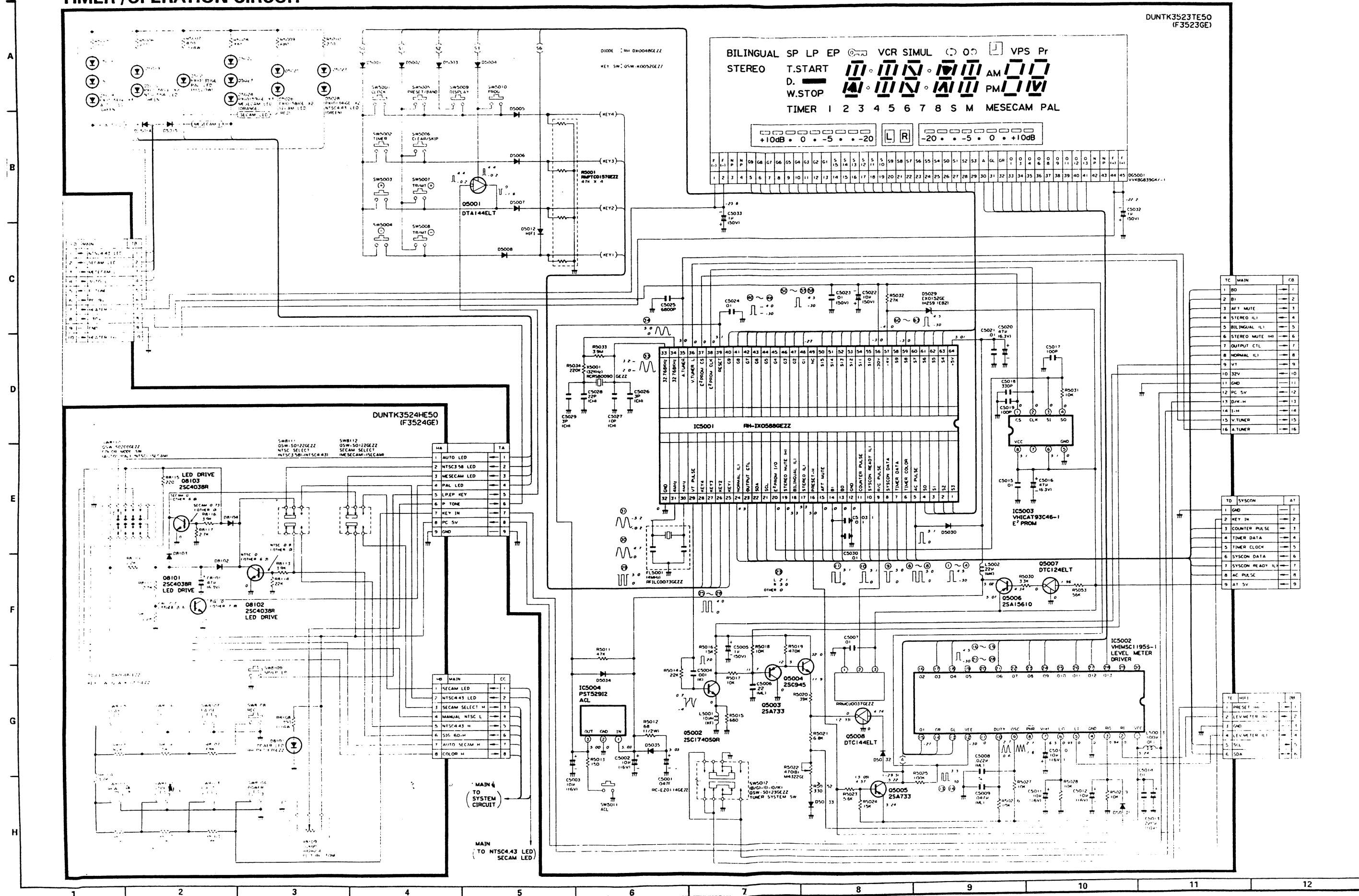


VOLTAGE MEASUREMENT MODE
PB Parentheses ()
REC Without Parentheses
VIDE-V24277 / DRUCK 14

E-E Signal



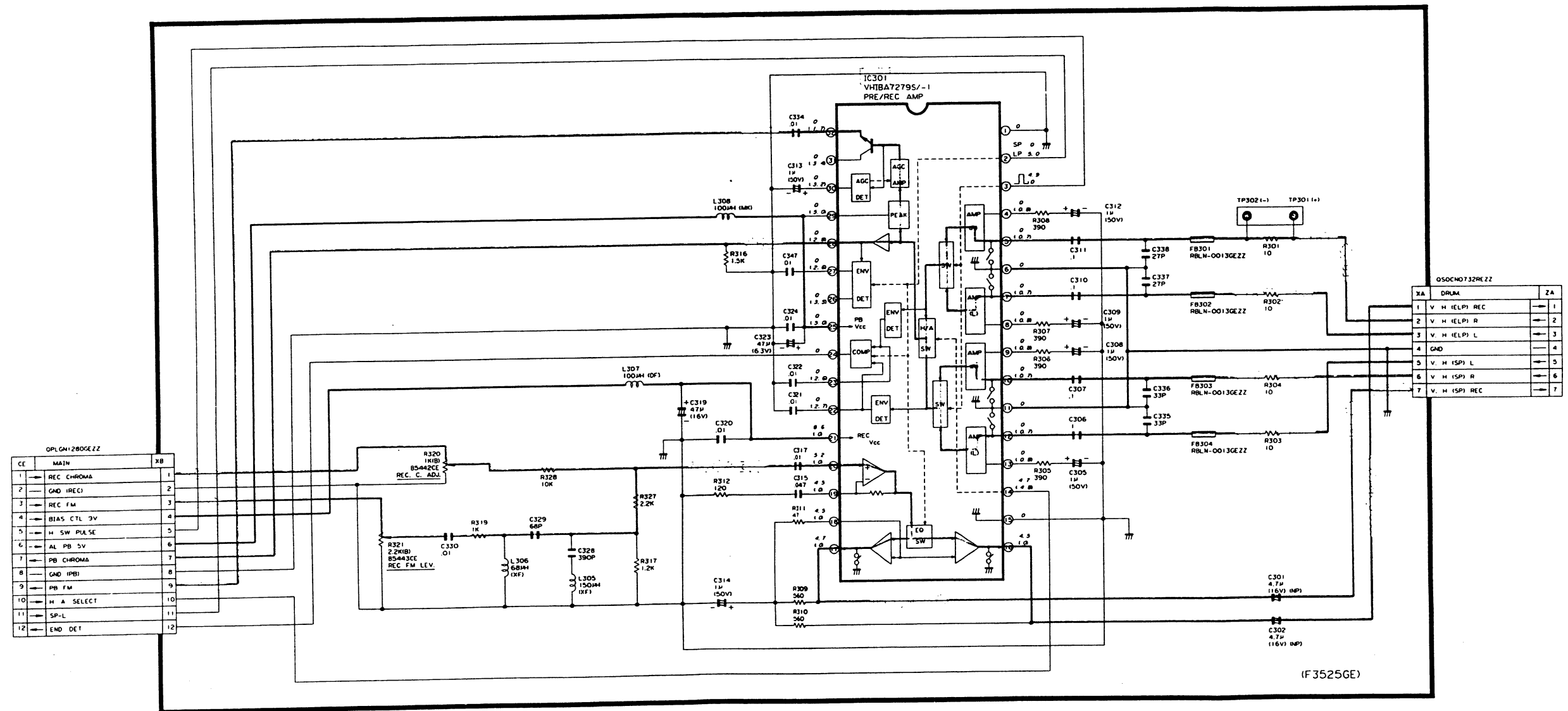
TIMER / OPERATION CIRCUIT



VC-90ET

VC-90ET

HEAD AMPLIFIER CIRCUIT

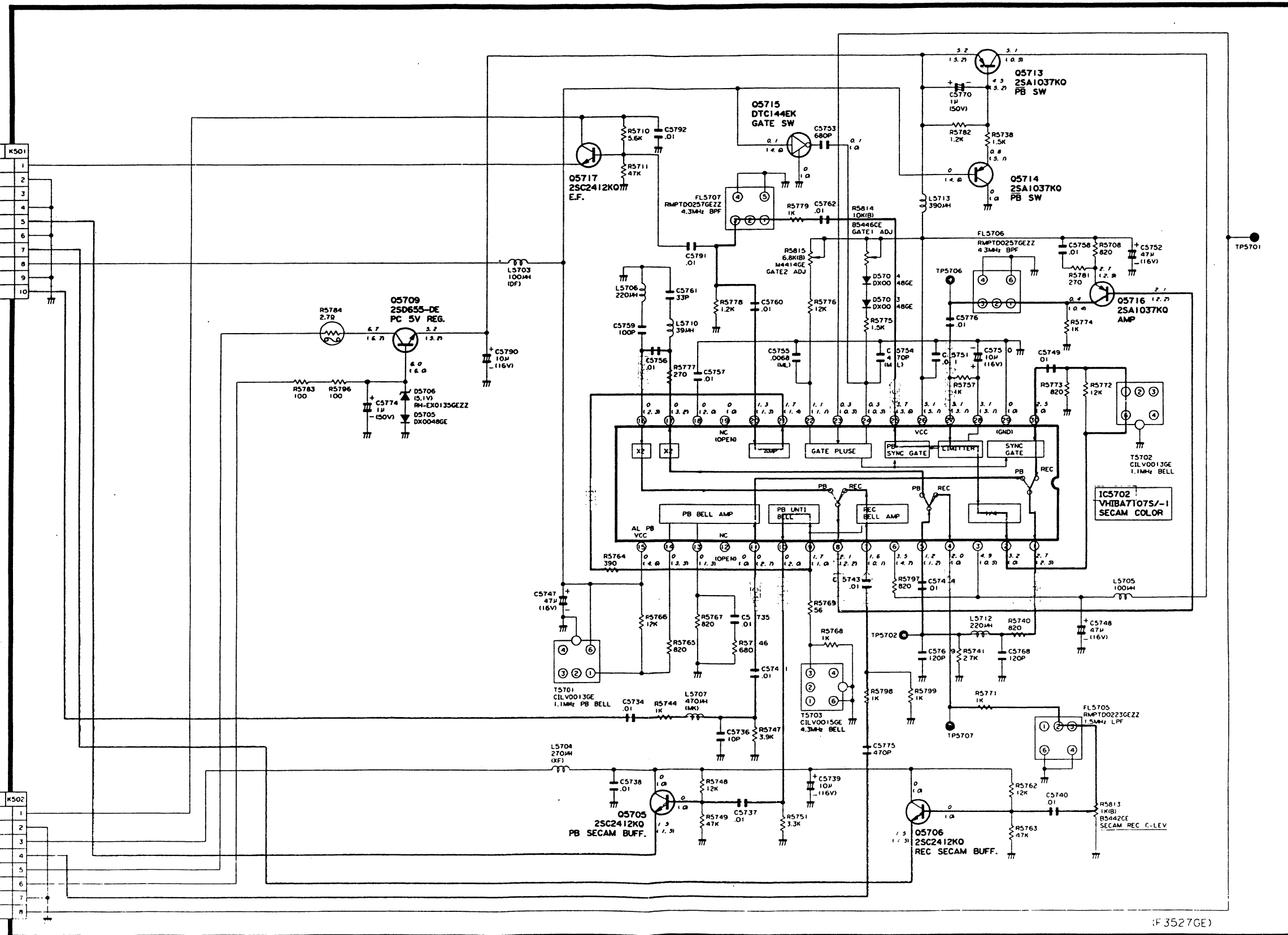
Playback Luminance Signal
Recording Luminance SignalPlayback Chrominance Signal
Recording Chrominance Signal

SUB CHROMA (SECAM) CIRCUIT

Playback Chrominance Signal Recording Chrominance Signal

050CN1079GEZZ		
K501	MAIN	K501
1	SECAM DET. CHROMA	1
2	GND	2
3	NC	3
4	GND	4
5	PB CHROMA	5
6	GND	6
7	REC. CHROMA	7
8	PB 5V	8
9	GND	9
10	PB FM	10

050CN0879G77		
K502	MAIN	K502
1	SECAM SELECT 5V	1
2	GND	2
3	SECAM 5V	3
4	VIDEO	4
5	AT 6.5V	5
6	PC 9V	6
7	GND	7
8	SYNC	8



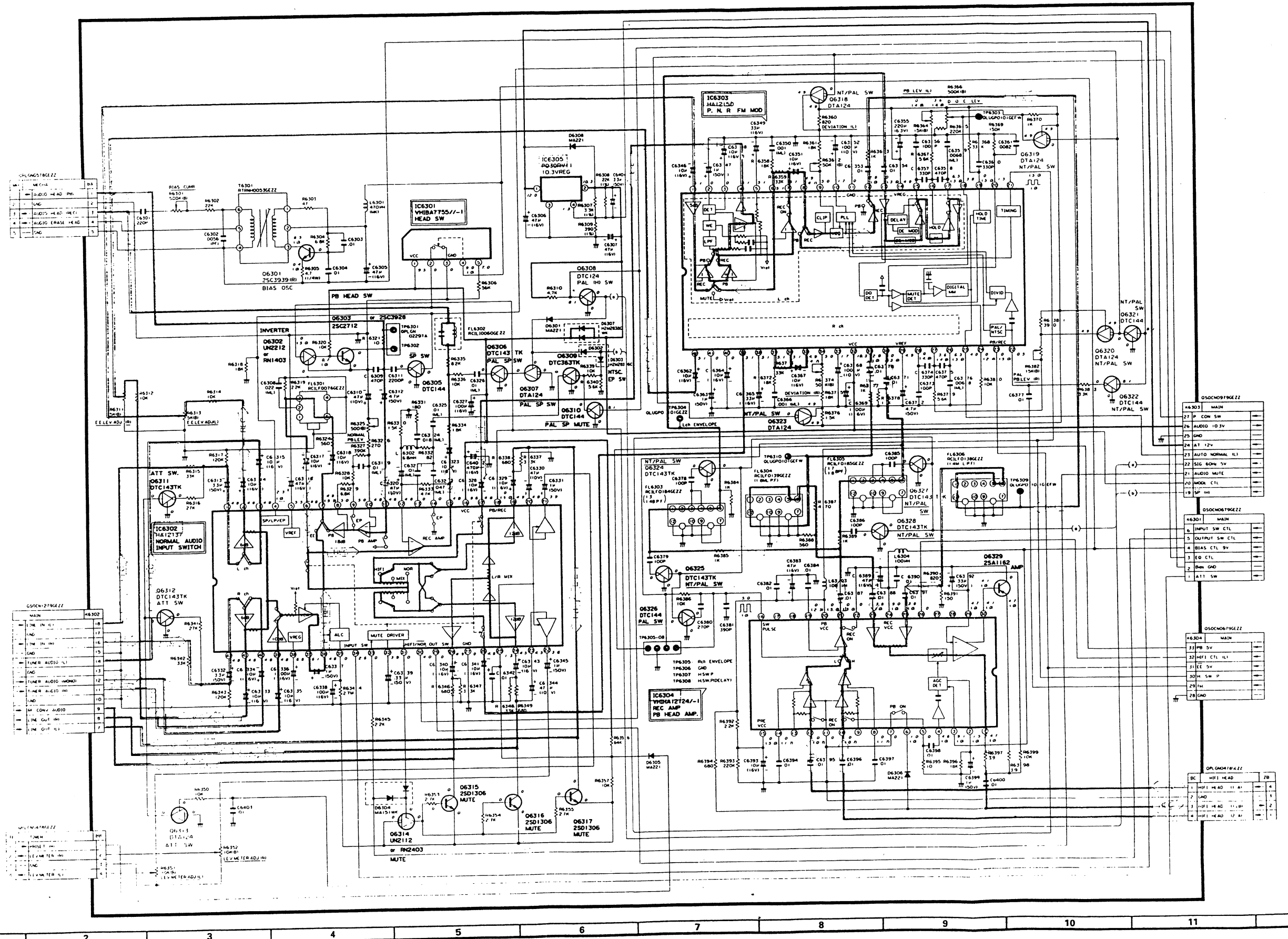
VC-90ET

VC-90ET

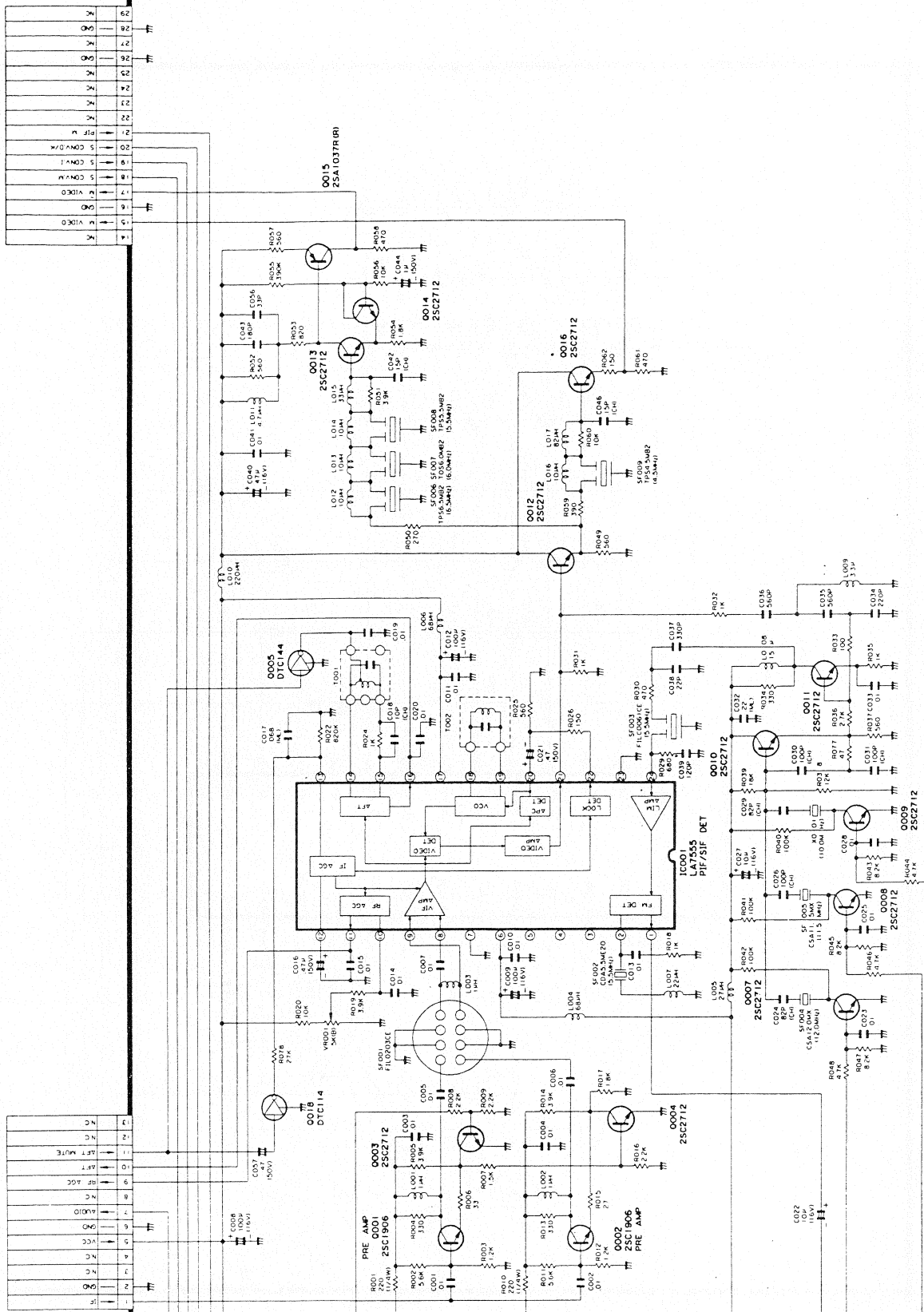
HiFi-CIRCUIT

Playback Signal
Recording Signal

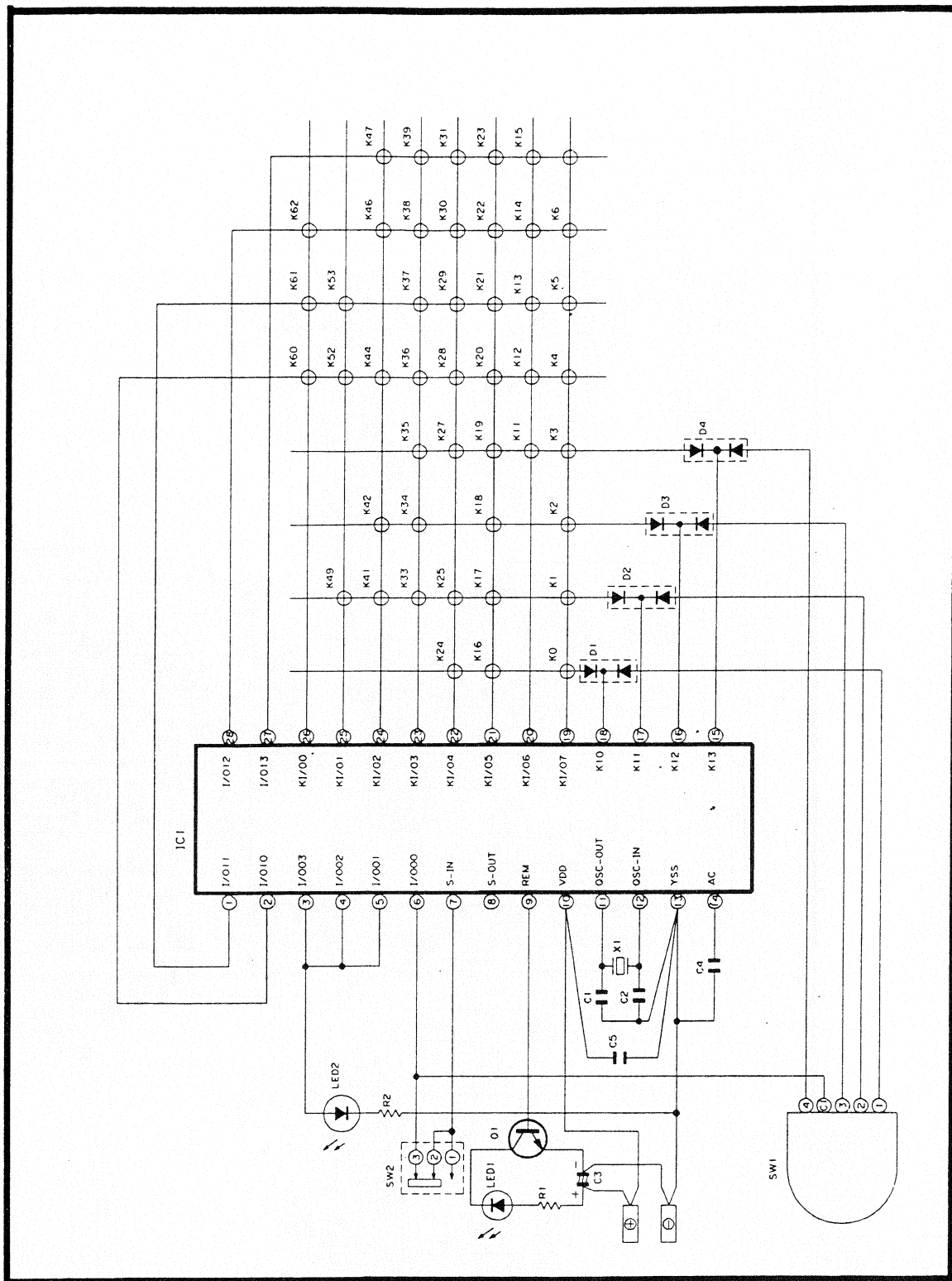
E-E Signal

VOLTAGE MEASUREMENT MODE
PB Parentheses ()

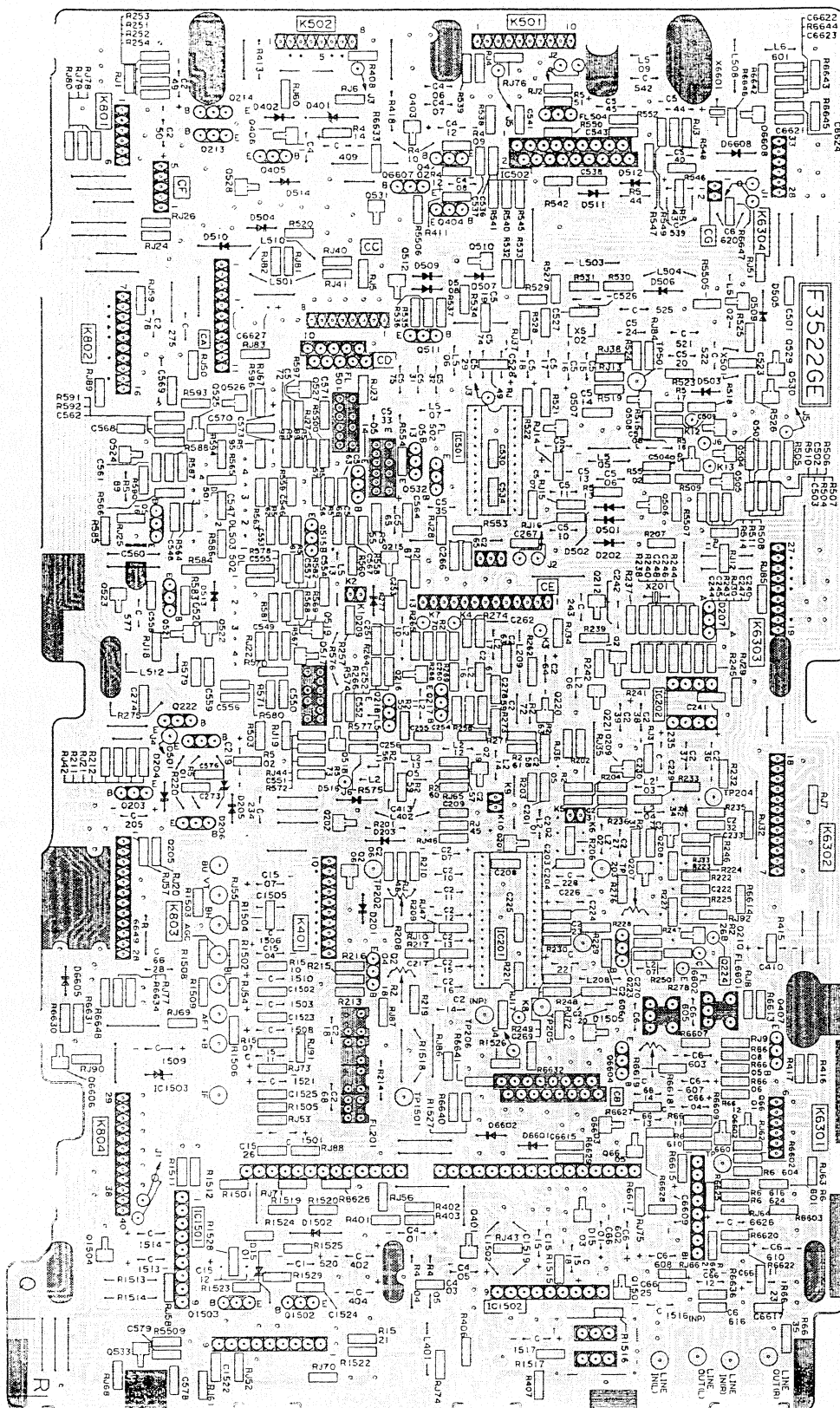
IF PACK



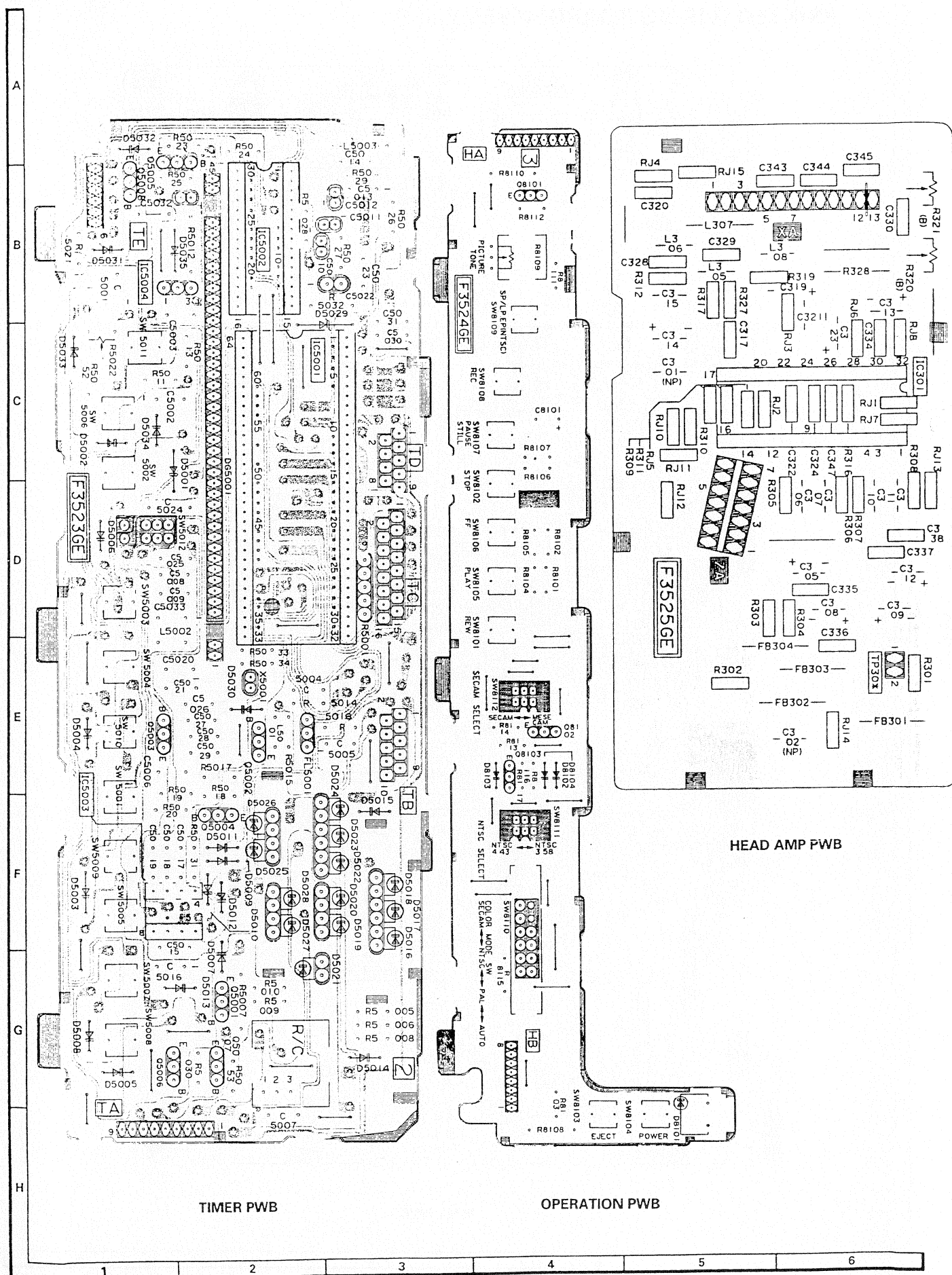
INFRARED REMOTE CONTROL CIRCUIT



PRINTED WIRING BOARD ASSEMBLIES

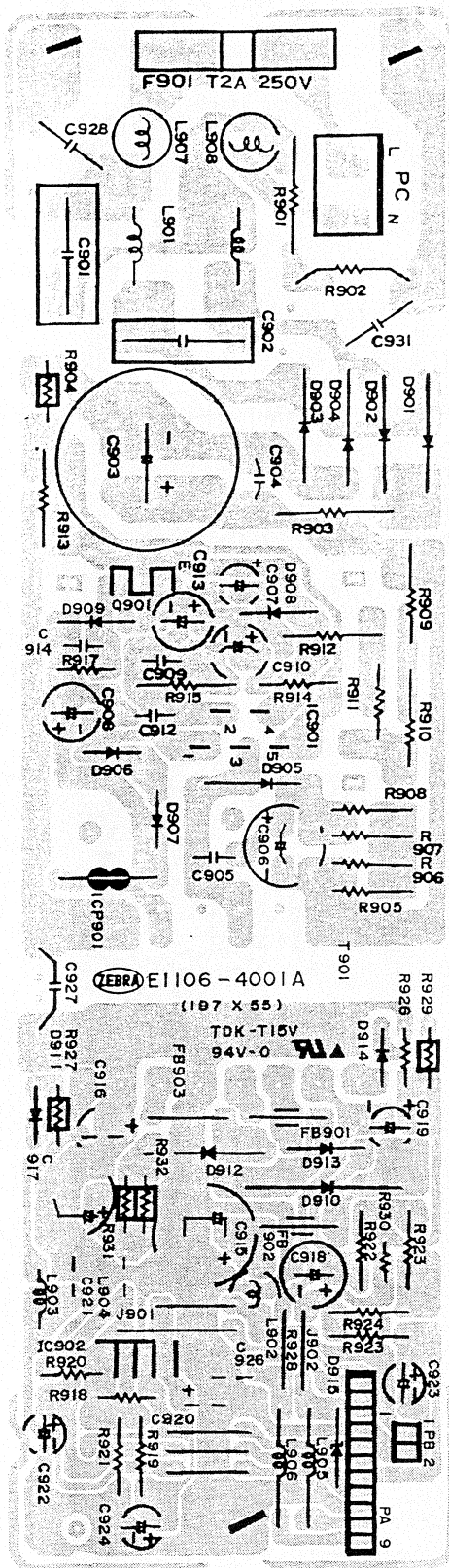


MAIN PWB

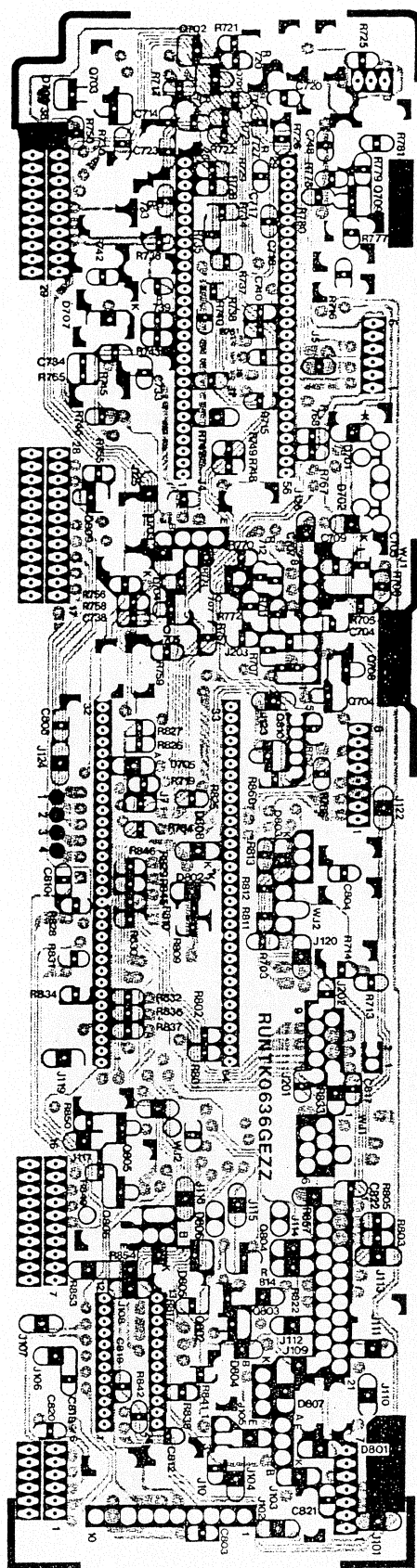




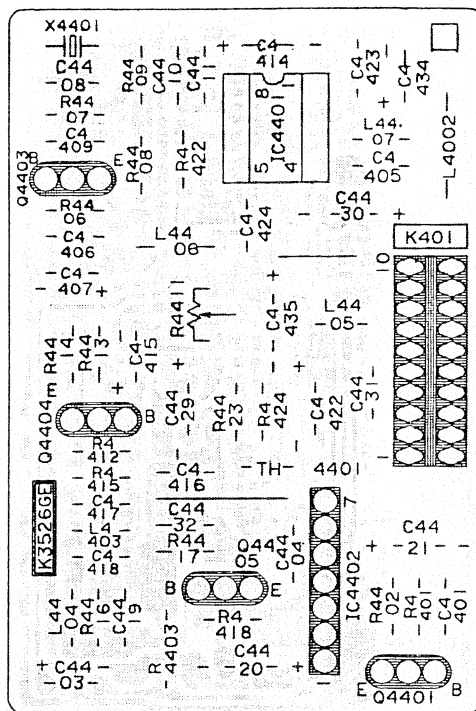
HiFi PWB



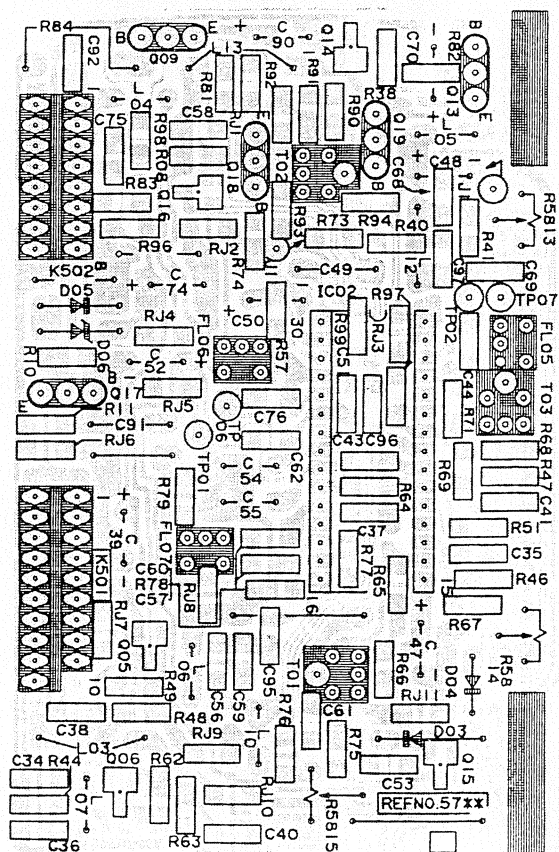
POWER PWB



SYSTEM CONTROL/SERVO PWB



NTSC SKEW PWB



SUB CHROMA (SECAM) PWB

REPLACEMENT PARTS LIST

PARTS REPLACEMENT

Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by Δ and shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |
| 5. PRICE CODE | |

Δ MARK: SAFETY RELATED PARTS

PWB ASSEMBLY IS NOT REPLACEMENT ITEM

Ref. No.	Part No.	Description	Code
----------	----------	-------------	------

MAIN CIRCUIT

	DUNTK3522XM50	Main Board Assembly	—
--	---------------	---------------------	---

TRANSISTORS

Q201, 202, 207, 212, 502, 507, 509, 522, 529, 530, 1501	VSDTC144EK/-1	DTC144EK	AB	Q208, 401	VS2SA1037KQ-1	2SA1037KQ	AA
Q203, 213, 214, 1503	VS2SA933SQR1E	2SA933SQR	AB	Q209, 210, 211, 215, 216, 219, 220, 221, 223, 404, 504, 505, 508, 510, 517, 518, 519, 520, 523, 524, 525, 526, 527, 6602, 6608	VS2SC2412KQ-1	2SC2412KQ	AA
Q204, 402, 511, 1502	VS2SC1815YW-1	2SC1815	AC	Q217, 218, 513, 514, 515, 516, 521, 532	VS2C1740SQR1E	2S1740SQR	AC
Q205, 222, 501	VS2SD655-DE1E	2SD655	AC	Q224, Q403, Q405, Q406, 503, 512, 528, 1504, 6603, 6606	VSDTC124ES/-1	DTC124ES	AB
					VSDTA124EK/-1	DTA124EK	AB
					VS2SD468-C/-1	2SD468	AD
					VSDTA144EK/-1	DTA144EK	AC
				Q407, Q506, Q531, Q6604, Q6605, Q6607	VS2SB1117KU1E	2SB1117	AE
					VSDTC124EK/-1	DTC124EK	AB
					VSDTC144ES/-1	DTC144ES	AB
					VSDTC143ES/-1	DTC143ES	AB
					VSDTC114EK/-1	DTC114EK	AB
					VSDTA143ES/-1	DTA143ES	AB

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
INTEGRATED CIRCUITS				CONTROLS			
IC201	VHiAN3248NK-1		AP	R209,	RVR-M4417GEZZ	22k (B), PB Level adj.	AB
IC202	VHiLC8992//1		AK	218		EE Level adj.	
IC501	VHiTA8757AN-1		AP	R223,	RVR-M4415GEZZ	10k (B), White Clip adj.	AB
IC502	VHiBA7025L/-1		AP	227,		FM Carrir adj.	
IC1501	RH-iX0203GEZZ		AE	6618		Audio Level adj	
IC1502	VHiTA7348P/-1		AK	R228	RVR-M4413GEZZ	4.7k (B), Deviation adj.	AB
IC1503	VHiUPC574JT-1		AC	R234	RVR-M4407GEZZ	470 (B), Delay Level adj.	AB
IC6601	VHiBA15218N-1		AD				
DIODES AND CRYSTAL				COILS AND TRANSFORMERS			
D202,	RH-DX0053GEZZ	1S5132	AA	L201	VP-XF680K0000	68μH	AB
203,				L202,	VP-XF150K0000	15μH	AB
204,				210,			
205,				216			
209,				L203	VP-XF560K0000	56μH	AB
402,				L204,	VP-XF330K0000	33μH	AB
501,				214			
502,				L205,	VP-DF221K0000	220μH	AB
503,				209,			
504,				401,			
505,				508,			
506,				510,			
507,				511,			
508,				512,			
509,				1502			
510,				L206,	VP-XF101K0000	100μH	AB
511,				6601			
512,				L207,	VP-XF151K0000	150μH	AB
513,				212,			
514,				217			
516,				L208	VP-XF181K0000	180μH	AB
1502,				L211	VP-XF470K0000	47μH	AB
6602,				L213	VP-XF100K0000	10μH	AB
6605,				L402	VP-DF100K0000	10μH	AB
6608				L502,	VP-DF471K0000	470μH	AB
D206,	RH-EX0135GEZZ	Zener Diode	AA	503,			
401				504			
D207	RH-DX0028GEZZ		AC	L505	VP-XF221K0000	220μH	AB
D1501	RH-EX0374GEZZ	HZS6	AA	L506	VP-XF5R6K0000	5.6μH	AB
D1503	VHD1S2837//1E	1S2837	AC	L507	VP-XF270K0000	27μH	AB
D1505	VHD1S2835//1E	1S2835	AC	L509	VP-YF153J0000	15mH	AC
X201	RCRSB0121GEZZ	Crystal	AH	L513	VP-DF561K0000	560μH	AB
X501	RCRSB0002CEZZ	Crystal	AM	FL201	RCiLF0190GEZZ		AL
X502	RCRSB0009GEZZ	Crystal	AL	FL501	RCiLF0192GEZZ		AG
X6601	RCRSB0005CEZZ	Crystal	AN	FL502	RCiLF0191GEZZ		AG
				FL503	RMPTD0339GEZZ		AF
				FL504	RFiLC0029TAZZ		AD
				FL6602	RCiLF0076GEZZ		AF
				DL501	RCiLZ0208GEZZ		AN
				DL502	RCiLZ0293GEZZ		AP
				DL503	RCiLZ0292GEZZ		AP

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
TRIMMER					QPLGN0878GEZZ	Plug, 8 pin (CC)	AC
C521, 525	RTδ-H1039GEZZ	Trimmer	AC		QPLGN0879GEZZ	Plug, 8 pin (K502)	AB
					QPLGN0979GEZZ	Plug, 9 pin (K6303)	AC
					QPLGN1079GEZZ	Plug, 10 pin (K401, K501, K802, K804)	AB
					QPLGN1178GEZZ	Plug, 11 pin (CA)	AC
CAPACITORS					QPLGN1278GEZZ	Plug, 12 pin (CE)	AC
C212, 512	VCEAGA0JW107M	100μF, 6.3V, 20%, Electrolytic	AB		QPLGN1279GEZZ	Plug, 12 pin (K803, K6302)	AC
C214	VCE9EA1HW335M	3.3μF, 50V, 20%, Electrolytic (N.P.)	AB		QSDCN1094GEZZ	Socket, 10 pin (CD)	AC
C220, 6606	RC-QZA223TAYJ	0.022μF, 50V, 5%, Mylar	AB		QSDCN1694GEZZ	Socket, 16 pin (CB)	AD
C227, 234, 239	VCFYSA1HB104J	0.1μF, 50V, 5%, Mylar	AB	HEAD AMP. CIRCUIT			
C275, 276	VCFYSA1HB224J	0.22μF, 50V, 5%, Mylar			DUNTK3525XM50	Head Amp. Board Assembly	—
C405	VCEA2A0JW477M	470μF, 6.3V, 20%, Electrolytic	AB	INTEGRATED CIRCUIT			
C406, 407	VCFYSA1HB563J	0.056μF, 50V, 5%, Mylar	AA	IC301	VHIBA7279S/-1		AL
C515	RC-QZA222TAYJ	2200pF, 50V, 5%, Mylar	AB	CONTROLS			
C517, 535	VCFYSA1HB333J	0.033μF, 50V, 5%, Mylar	AE	R320	RVR-B5442CEZZ	1k (B), Rec. Chroma adj.	AB
C540	VCEAEA1CW107M	100μF, 16V, 20%, Electrolytic	AC	R321	RVR-B5443CEZZ	2.2k (B), Rec. FM Level adj.	AB
C542	RC-QZA273TAYJ	0.027μF, 50V, 5%, Mylar	AB	COILS			
C1501	VCEA2A1CW337M	330μF, 16V, 20%, Electrolytic	AB	L305	VP-XF151K0000	150μH	AB
C1505, 1506	VCFYSA1HB334J	0.33μF, 50V, 5%, Mylar	AB	L306	VP-XF680K0000	68μH	AB
C1516	VCE9EA1CW226M	22μF, 16V, 20%, Electrolytic (N.P.)	AC	L307	VP-DF101K0000	100μH	AB
C1520	VCEAGA1AW227M	220μF, 10V, 20%, Electrolytic	AB	L308	VP-MK101K0000	100μH	AB
C6613	RC-QZA822TAYJ	0.0082μF, 50V, 5%, Mylar	AB	CAPACITORS			
C6614	RC-QZA183TAYJ	0.018μF, 50V, 5%, Mylar	AB	C301, 302	VCE9EA1CW475M	4.7μF, 16V, 20%, Electrolytic (N.P.)	AB
C6627	VCEA2U1CW337M	330μF, 16V, 20%, Electrolytic	AB	C306, 307, 310, 311	RC-KZ0029GEZZ	0.1μF, 50V, +80%~-20%, Ceramic	AA
MISCELLANEOUS				C315	VCFYSA1HB473J	0.047μF, 50V, 5%, Mylar	AA
	RIFU-0581GEZZ	IF Pack Unit	BE	MISCELLANEOUS			
	RCNVR0090GEZZ	RF Converter	BC		QPLGN0229TAZZ	Plug, 2 pin (TP301, TP302)	AB
	VTUδF4Eδ-722/	Tuner	AB		QPLGN1280GEZZ	Plug, 12 pin (XB)	AC
	QJAKF0009GEZZ	Jack, Video Input/Output	AD		QSDCN0732REZZ	Socket, 7 pin (XA)	AC
	QJAKH0002GEZZ	Jack, Audio Input/Output	AF				
	QSW-S0079GEZZ	Switch, Audio ATT.	AE				
	QPLGN0278GEZZ	Plug, 2 pin (CG)	AA				
	QPLGN0328TAZZ	Plug, 3 pin (Test Point)	AD				
	QPLGN0678GEZZ	Plug, 6 pin (CF)	AB				
	QPLGN0679GEZZ	Plug, 6 pin (K801, K6301, K6304)	AB				

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
TIMER CIRCUIT				5024 D5025, 5026 D5029 X5001	RH-PX0158GEZZ RH-EX0152GEZZ RCRSB0090GEZZ	LED HZS91E Crystal	AB AA AE
	DUNTK3523HE50	Timer Board Assembly	—				
TRANSISTORS							
Q5001 Q5002 Q5003, 5005 Q5004 Q5006 Q5007 Q5008	VSDTA144ELT-1 VS2C1740SQR1E VS2SA733APQ1E VS2SC945APQ1E VS2SA1561Q/1E VSDTC124ELT-1 VSDTC144ELT-1	DTA144EL 2C1740SQR 2SA733 2SC945 2SA1561 DTC124EL DTC144EL	AB AC AC AB AC AA AB				
CONTROL							
				R5022	RVR-M4322GEZZ	470 (B) Level Meter adj	AB
COILS AND TRANSFORMERS							
				L5001 L5002 L5003 FL5001	VP-XF100K0000 VP-MK220K0000 VP-DF101K0000 RFILC0073GEZ	10μH 22μH 100μH	AF AB AB AD
INTEGRATED CIRCUITS							
IC5001 IC5002 IC5003 IC5004	RH-IX0588GEZZ VHIMSC1195S-1 VHiCAT93C46-1 VHiPST529i2-1		AW AP AN AD				
DIODES AND CRYSTAL							
D5001, 5002, 5003, 5004, 5005, 5006, 5007, 5008, 5012, 5014, 5015, 5030, 5031, 5032, 5033, 5034, 5035 D5016, 5017, 5018, 5019, 5020, 5027, 5028 D5021 D5022, 5023,	RH-DX0053GEZZ <						

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
	QS6CN0995GEZZ	Socket, 9 pin (TD)	AC	SYSTEM CONTROL / SERVO CIRCUIT			
	QS 6CN1095GEZZ	Socket, 10 pin (TB)	AC		RUNTK0636GEZZ	System Control / SERVO Board Assembly	—
	QS6CN1695GEZZ	Socket, 16 pin (TC)	AC		TRANSISTORS		
OPERATION CIRCUIT				Q701, 702, 703	98M-2SA1162YG	2SA1162Y	AB
	DUNTK3524HE50	Operation Board Assembly	—	Q704	98M-UN2111///	UN2111	AB
	TRANSISTORS			Q705, 707, 709, 802, 803, 804, 805, 806	98M-2SC2712YG	2SC2712Y	AB
Q8101, 8102, 8103	VS2SC4038R/1E	2SC4038R	AB	Q706, 807	98M2SD655DE//	2SD655	AC
DIODES				Q708, 809, 810	98M-UN2112///	UN2112	AB
D8101	RH-PX0167GEZZ	LED	AB	Q801, 808	98M2SC2001L//	2SC2001LK	AC
D8102, 8103, 8104	RH-DX0053GEZZ	1SS132	AA	INTEGRATED CIRCUITS			
CONTROL				IC701	RH-IX0960GEZZ		AS
R8109	RVR-B4262GEZZ	10k (B), Picture Tone	AD	IC702	98M-M5218AL//		AD
MISCELLANEOUS				IC801	RH-IX0800GEZZ		AW
SW8101, 8102, 8103, 8104, 8105, 8106, 8107, 8108, 8109	QSW-K0079GEZZ	Switch, Rew. Switch, Stop Switch, Eject Switch, Power Switch, Play Switch, FF Switch, Pause Switch, Rec. Switch, SP/LP EP	AB	IC802	RH-IX0479GEZZ		AL
SW8110	QSW-S0200GEZZ	Switch, Colour Mode	AE	IC803	VHiBA6209//1E		AG
SW8111, 8112	QSW-S0122GEZZ	Switch, NTSC Select Switch, SECAM Select	AD	IC804	VHiPST529H2-1		AD
	QPLGN0878GEZZ	Plug, 8 pin (HB)	AC	DIODES			
	QS6CZ0930GEZZ	Socket, 9 pin (HA)	AC	D701, 702, 703, 705, 707, 801, 802, 803, 804, 805, 807, 808	98M-MA221///	MA221	AB
				D706	98M-HSM123///	HSM123	AB

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
D704, 806	98M-02CZ5.1Y/	02CZ5.1Y	AB	HiFi MODULE CIRCUIT			
CONTROLS					RUNTK0631GEZZ	HiFi module Board Assembly	—
R751	98MVG066HB104	100k (B), PAL Phase Generator MM	AC	TRANSISTORS			
R753	98MVZ066HB684	680k (B), NTSC Phase Generator MM	AC	Q6301	98M-2SC3939R/	2SC3939	AC
COIL				Q6302	98M-UN2212/// or 98M-RN1403///	UN2212 RN1403	AB AB
FL801	RFILC0073CEZZ	Filter	AL	Q6303	98M2SC2712Y/G	2SC2712	AB
CAPACITORS				Q6305, 6310, 6321, 6322, 6326	98M-DTC144EK/ or 98M-UN2213///	DTC144 UN2213	AB AB
C711, 722	98MECEA1AU101	100μF, 10V, Electrolytic	AB	Q6306, 6311, 6312, 6324, 6325, 6327, 6328	98M-DTC143TK/ or 98M-UN2216///	DTC143TK UN2216	AB AB
C725, 730	98MECEA1HN2R2	2.2μF, 50V, Electrolytic (N.P.)	AB	Q6307, 6313, 6318, 6319, 6320, 6323	98M-DTA124EK/ or 98M-UN2112///	DTA124 UN2112	AB AB
C735	98MECEA1CN100	10μF, 16V, Electrolytic (N.P.)	AB	Q6308	98M-DTC124EK/ or 98M-UN2212///	DTC124 UN2212	AB AB
C745	98MECEA1EU101	100μF, 25V, Electrolytic	AB	Q6309	98M-DTC363TK/	DTC363TK	AC
C801	98MECEA1CU331	330μF, 16V, Electrolytic	AC	Q6314	98M-UN2112/// or 98M-RN2403///	UN2112 RN2403	AB AB
C802	98MECEA1HN010	1μF, 50V, Electrolytic (N.P.)	AB	Q6315, 6316, 6317	98M-2SD1306//	2SD1306	AC
RESISTOR				Q6329	98M2SA1162Y/G	2SA1162	AB
R852	98MFMR14B3R3J	3.3 ohm, 1/4 W, Fuse Resistor	AB	INTEGRATED CIRCUITS			
MISCELLANEOUS				IC6301	VHiBA7755/-1		AD
	98MJST06MQ-ST	Plug, 6 pin (K801)	AC	IC6302	VHiHA12137/-1		AS
	98MJST10MQ-ST	Plug, 10 pin (K802)	AC	IC6303	VHiHA12150/-1		AW
	98MJST12MQ-ST	Plug, 12 pin (K803)	AD	IC6304	VHiHA12124/-1		AH
	98MJST12MQ-ST	Plug, 10 pin (K804)	AD	IC6305	98MPQ30RV11//		AH
	98MB3B-PH-K-S	Plug, 3 pin (AH)	AA				
	98MB7B-PH-K-S	Plug, 7 pin (AL)	AB				
	98M8370-211//	Socket, 21 pin (AM)	AE				
	98M8370-061//	Socket, 6 pin (AG)	AC				
	98M8370-091//	Socket, 9 pin (AT)	AD				

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
DIODES				MISCELLANEOUS			
D6301, 6305, 6306, 6308	98 MMA 2 2 1 // // //	MA221	AB		98 M 0 6 M Q - S T // //	Socket, 6 pin (K6301, K6304)	AC
D6302, 6303	98 MHZ M 2 8 3 6 C //	HZM2836C	AB		98 M 1 2 M Q - S T // //	Socket, 12 pin (K6302)	AD
	or				98 M 0 9 M Q - S T // //	Socket, 9 pin (K6303)	AC
D6304	98 MMA 1 5 1 W A // //	MA151WA	AB		98 M S 5 B - P H - K S /	Plug, 5 pin (BA)	AB
	98 MHZ M 2 8 3 8 C //	HZM2838C	AB		98 M B 4 B - P H - K S /	Plug, 4 pin (BB, BC)	AB
	or			NTSC SKEW CIRCUIT			
D6307	98 MMA 1 5 1 W K // //	MA151WK	AB		DUNT K 3 5 2 6 H E 5 0	NTSC Skew Board Assembly	—
	98 MHZ M 2 8 3 8 C //	HZM2838C	AB	TRANSISTORS			
CONTROLS				Q4401	VS 2 S A 1 5 6 1 Q / 1 E	2SC1561L2Q	AC
R6301, 6366	98 MVZ 0 6 6 H 1 B 5 5	500k (B), Bais Curr.	AB	Q4403, 4404	VS 2 C 1 7 4 0 S Q R 1 E	2C1740SQR	AC
R6311, 6313	98 MVZ 0 6 6 L 1 B 5 3	5k (B), EE Level (R)	AB	Q4405	VS 2 S A 9 3 3 S Q R 1 E	2SA933SQR	AB
R6325	98 MVZ 0 6 6 H 1 B 5 2	5k (B), EE Level (L)	AB	INTEGRATED CIRCUITS			
R6351, 6352	98 MVZ 0 6 6 H 1 B 1 4	500 (B), Normal PB Level	AB	IC4401	V H I T L 8 8 1 1 P / - 1		AM
R6362, 6374	98 MVZ 0 6 6 L 1 B 5 4	10k (B), Level Meter (L)	AB	IC4402	V H I T A 7 3 4 7 P / - 1		AG
R6364, 6382	98 MVZ 0 6 6 L 1 B E 4	10k (B), Level Meter (R)	AC	DIODES AND CRYSTAL			
		50k (B), Deviation (L)	AB	TH4401	RH - H Z 0 0 3 1 G E Z Z	Thermistor	AB
		50k (B), Deviation (R)		X4401	R C R S B 0 1 1 1 G E Z Z	Crystal	AG
		15k (B), PB Level (L)		CONTROL			
		15k (B), PAL PB Level (R)		R4411	R V R - M 4 2 2 3 C E Z Z	2.2k (B), Flicker	AB
COILS AND TRANSFORMERS				COILS			
L6301	98 M 0 6 0 6 R A 4 7 1 K	470 μ H	AB	L4402	VP - D F 1 0 1 K 0 0 0 0	100 μ H	AB
L6302	98 M - L 0 6 T B 6 8 2 J	6.8mH	AC	L4403	VP - X F 3 3 0 K 0 0 0 0	33 μ H	AB
L6303, 6304	98 M 0 4 0 5 R A 1 0 1 K	100 μ H	AB	L4404	VP - X F 4 7 0 K 0 0 0 0	47 μ H	AB
L6301	R C i L F 0 0 7 6 G E Z Z	Filter	AF	L4405	VP - M K 6 8 0 K 0 0 0 0	68 μ H	AB
FL6302	R C i L i 0 0 6 0 G E Z Z	Filter	AD	L4406, 4407	VP - X F 6 8 8 K 0 0 0 0	6.8 μ H	AB
FL6303	R C i L F 0 1 8 4 G E Z Z	Filter	AF	CAPACITORS			
FL6304	R C i L F 0 1 3 9 G E Z Z	Filter	AG	C6327, 6336, 6338, 6369	98 M A 1 C U 1 0 1 B //	100 μ F, 16V, Electrolytic	AB
FL6305	R C i L F 0 1 8 5 G E Z Z	Filter	AF	C6352, 6368	98 M A 1 A U 1 0 1 B //	100 μ F, 10V, Electrolytic	AB
FL6306	R C i L F 0 1 3 8 G E Z Z	Filter	AG	C6355	98 M A 0 J U 2 2 1 B //	220 μ F, 6.3V, Electrolytic	AB
T6301	R T R N H 0 0 5 3 G E Z Z	Transformer	AE	C6402	98 M A 1 C U 4 7 1 B Q /	470 μ F, 16V, Electrolytic	AC

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
CAPACITORS				COILS AND TRANSFORMERS			
C4422	VCEAEA1CW107M	100 μ F, 16V, 20%, Electrolytic	AC	L5703	VP-DF101K0000	100 μ H	AB
C4424	VCFYSA1HB394J	0.39 μ F, 50V, 5%, Mylar	AC	L5704	VP-MK271K0000	270 μ H	AB
C4431	VCFYSA1HB104J	0.1 μ F, 50V, 5%, Mylar	AB	L5705	VP-XF101K0000	100 μ H	AB
MISCELLANEOUS				L5706	VP-MK221K0000	220 μ H	AB
	QS6CN1079GEZZ	Socket, 10 pin (K401)	AC	L5707	VP-MK471K0000	470 μ H	AB
SUB CHROMA (SECAM) CIRCUIT				L5710	VP-XF390K0000	39 μ H	AB
	DUNTK3527TM50	Sub Chroma (SECAM) Board Assembly	—	L5712	VP-XF221K0000	220 μ H	AB
TRANSISTORS				L5713	VP-DF391K0000	390 μ H	AC
Q5705, 5706, 5717	VS2SC2412KQ-1	2SC2412K	AA	T5701, 5702	RCiLV0013GEZZ		AF
Q5709	VS2SD655-DE1E	2SD655	AC	T5703	RCiLV0015GEZZ		AF
Q5713, 5714, 5716	VS2SA1037KQ-1	2SA1037K	AA	FL5705	RMPTD0223GEZZ		AE
Q5715	VSDTC144EK/-1	DTC144EK	AB	FL5706, 5707	RMPTD0257GEZZ		AD
INTEGRATED CIRCUIT				CAPACITORS			
IC5702	VHIBA7107S/-1		AS	C5754	RC-QZA471TAYJ	470pF, 50V, 5%, Mylar	AA
DIODES				C5755	RC-QZA682TAYJ	0.0068 μ F, 50V, 5%, Mylar	AB
D5703, 5704, 5705	RH-DX0048GEZZ	1N4531	AA	MISCELLANEOUS			
D5706	RH-EX0135GEZZ	Zener Diode	AA		QS6CN0879GEZZ	Socket, 8 pin (K502)	AC
CONTROLS					QS6CN1079GEZZ	Socket, 10 pin (K501)	AC
R5813	RVR-B5442CEZZ	1k(B), SECAM Rec. C Level	AB	POWER CIRCUIT			
R5814	RVR-B5446CEZZ	10k (B), Sync. Gate 1 Adj.	AB		RDENC0445GEZZ	Power Board Assembly	—
R5815	RBR-M4414GEZZ	6.8k (B), Sync. Gate 2 Adj.	AB	TRANSISTORS			
				△Q901	95KUAD0046AZ	2SD882	AH
				INTEGRATED CIRCUITS			
				△IC901	95KUCC0042AZ		AR
				△IC902	95KUCB0077AZ		AH
				DIODES			
				△D901, △902, △903, △904	95KUBC0213FZ	RL156	AC
				△D905	95KUBC0214BZ	R1200F	AC
				△D906	95KUBC0178AZ	DINL20	AD
					or 95KUBC0125AZ	ERA15-01	AB
					or 95KUBC0216CZ	1AS	AB

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
△D907	95KUBC0150AZ or 95KUBC0125AZ or 95KUBC0216CZ	11ES1 ERA15-01 1AS	AB AB AB	△C918 C923 △C927, △931 △C928	95KUGAJ220DC 95KUGAJ2R2BU 95KUGCZ471BT 95KUGCZ102BP	22μF, 100V, Electrolytic 2.2μF, 100V, Electrolytic 470pF, 4kV, Ceramic 1000pF, 4kV, Ceramic	AD AB AC AD
△D908, △916 △D909 △D910, △912 △D911, △913, △914 △D915	95KUBA0005AZ 95KUBC0143AA 95KUBC0212AZ 95KUBC0182CZ 95KUBDAC8R2C	1SS55 EU1Z SF22 10ELS4 RD8.2ESAB2	AB AD AE AD AB	RESISTORS			
COILS AND TRANSFORMER				△R901, △902 △R903 △R904, △929 △R905, △906, △907, △908 △R909, △910, △911, △912, △914 △R913 △R915	95KUECC685AB 95KUEFG5R6AA 95KUEBBR39AF 95KUEEC683AK 95KUEEC273AK	6.8M ohm, 1/2W, Solid 5.6 ohm, 5W, Oxide Film 0.39 ohm, Fuse Resistor 68k ohm, 1/2W, Carbon 27k ohm, 1/2W, Carbon	AB AD AC AA AA
△L901 L902 L903 L904 L905, 906 L907, 908 △T901	95KUKZ0328ZZ 95KUKZ0251ZZ or 95KUKZ0313ZZ 95KUKZ0102ZZ 95KUKZ0257ZZ 95KUKZ0312ZZ 95KUZZ0011ZZ 95K829035010	Line Filter Choke Coil Filter Filter Inductance Coil FL7H101K PTTP28	AB AE AE AC AE AF AD AY	△R917 △R918 △R919 △R920 △R921 △R922, △923, △924, △925 △R927 △R929 △R930 △R931, △932	95KUEEB103BB 95KUES1302AB 95KUEEB334BB 95KUES2001AB 95KUEEB473BB 95KUEEC271AK or 95KUEEC271AL 95KUEBB4R7AC 95KUEBBR39AF 95KUEZ0426ZZ 95KUEBBR47AF	10K ohm, 1/4W, Carbon 13k ohm, 1/4W, Carbon 330k ohm, 1/4W, Carbon 2k ohm, 1/4W, Carbon 47k ohm, 1/4W, Carbon 270 ohm, 1/2W, Carbon 0.47 ohm, Fuse Resistor 0.39 ohm, Fuse Resistor 6.8 ohm, Posistor 0.47 ohm, Fuse Resistor	AA AA AA AA AA AA AA AC AC AF AC
CAPACITORS				MISCELLANEOUS			
△C901 △C902 △C903 △C904, △905 △C906 △C907 △C908 △C909 △C910 △C912 △C913 △C914 C915 C917	95KUGZ0687ZZ 95KUGZ0662ZZ 95KUGBQ680BT or 95KUGBQ680BR 95KUGCZ101AB 95KUGAQ010DC or 95KUGAQ010HE 95KUGAJ100BU 95KUGAB220EG 95KUGFF333AR 95KUGAC101DC 95KUGFJ102AR 95KUGAC100EG 95KUGCZ471AA 95KUGAD102DW 95KUGAC102BU	0.1μF, 250V, Film 0.047, 50V, Ceramic 68μF, 400V, Electrolytic 100pF, 1kV, Ceramic 1μF, 400V, Electrolytic 10μF, 100V, Electrolytic 22μF, 10V, Electrolytic 0.033μF, 50V, Mylar 100μF, 16V, Electrolytic 1000pF, 100V, Film 10μF, 10V, Electrolytic 470pF, 500V, Ceramic 1000μF, 25V, Electrolytic 1000μF, 16V, Electrolytic	AB AE AP AN AC AP AD AC AE AB AC AB AF AB AF AE	△ △F901 △ICP901 PC PB PA	QACCZ3009GEZZ 95KPJCTB2001 95KPJCB1001 95KPKZ0194ZZ 95KPKZ0522ZZ 95KPKZ0531ZZ	AC Cord, 220V, 50Hz/60Hz Fuse, T2A, 250V Fuse, 1A, 125V Plug, 2 pin Plug, 2 pin Plug, 11 pin	AL AD AE AC AB AE

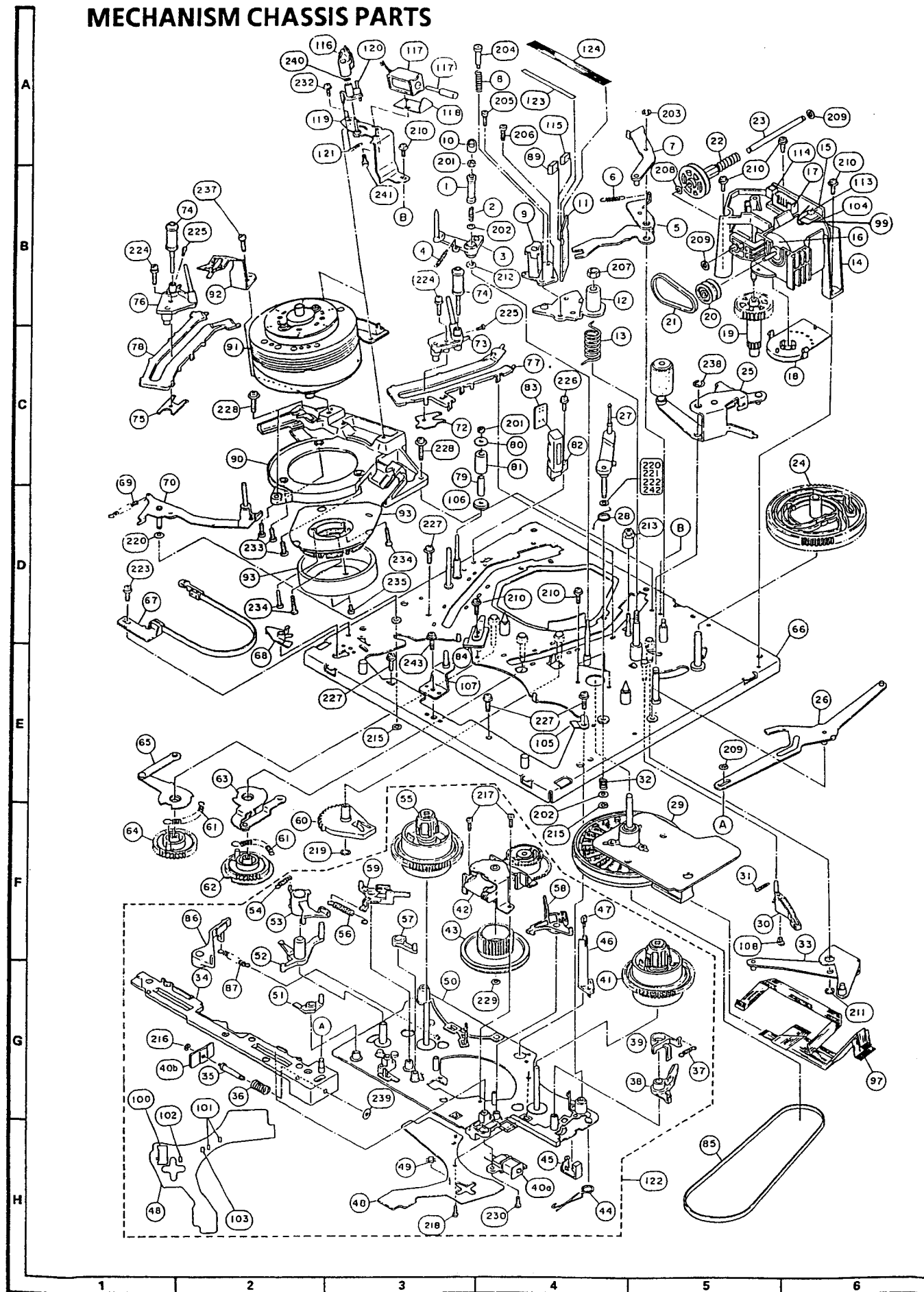
Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
INFRARED REMOTE CONTROL CIRCUIT				THE OTHER PARTS			
	RRMCG0733GESA	Infrared Remote Control Unit	BE		TINS-1636GEZZ QCNW-5650GEZZ CCNW-6096GE0S QPLGA0011CEZZ	Operation manual Antenna cord A/V cord AC Plug adaptor	AP AK AN AF
TRANSISTORS				MECHANISM CHASSIS PARTS			
Q1	92P3TSN0005T	2SC2411K	AD				
INTEGRATED CIRCUIT				MECHANISM CHASSIS PARTS			
IC1	92P3SQ00338		AW				
DIODES AND CRYSTALS				1	PGIDS0023GEFW	Retaining Guide	AE
D1, D2, D3, D4	92P3TSD0007T	DAN202K	AC	2	MSPRC0142GEFJ	Retaining Guide Spring	AA
LED1	92P3QH00019	SLR932A-1-A	AE	3	MLEVC0022GEZZ	Half-Loading Lever	AF
LED2	92P3SL00043	SLP-144B-51	AD	4	MSPRT0270GEFJ	Half-Loading Lever Spring	AA
X1	92P3TEF0002T	Filter	AG	5	MLEVF0284GEFW	Half-Loading Drive Lever	AC
MISCELLANEOUS				6	MSPRT0269GEFJ	Half-Loading Reciprocating Spring	AA
SW1	92PSRGPJJ008A	Switch, Shuttle	AR	7	MLEVF0283GEZZ	Half-Loading Reciprocating Lever	AB
SW2	92PSSSS21B59B	Switch, TV/VCR	AF	8	MSPRC0144GEFJ	Azimuth Spring	AA
CABINET PARTS				9	RHEDU0070GEZZ	Audio/Control Head Ass'y	AS
1	92PFA11H0902	Cabinet (A)	AP	10	PCAPS1015GEZZ	Retaining Guide Cap	AA
2	92PFA11H1001	Cabinet (B)	AL	11	QPWBF3504GEZZ	Audio/Control Head PWB	AB
3	92PFA11H1101	Cabinet (C)	AF	12	MLEVF0292GEZZ	Audio/Control Head Arm	AD
4	92PFA61C5201	Knob (A)	AE	13	MSPRD0087GEFJ	Audio/Control Head Arm Spring	AA
5	92PFA62D1202	Indication Plate (B)	AK	14	LHLDZ1606GEZZ	Loading Block Holder Ass'y	AC
6	92PFA62D1103	Indication Plate (A)	AP	15	QPRBF3409GEZZ	Loading Block PWB	AD
7	92PFA42C6403	Rubber Key	AU	16	RM6TM1049GEZZ	Loading Motor	AM
8	92PFA58B4601	Filter Cover	AF	17	QPLGN0780GEZZ	Plug, 7 pin (MG)	AC
9	92PFA61C5301	Knob (B)	AE	18	QSW-R0026GEZZ	Cam Switch	AE
10	92P3ETFD1301	Battery Terminal (-)	AD	19	NGERW1032GEZZ	Worm Wheel	AC
11	92P3ETFD1201	Battery Terminal (+)	AE	20	NPLYV0133GEZZ	Loading Motor Pulley	AC
12	92P3ETFD0301	Battery Terminal	AD	21	NBLTK0058GE00	Loading Motor Belt	AA
13	92P2A461080	Screw	AA	22	NGERW1031GEZZ	Worm Ass'y	AC
14	92P2A391050	Screw	AA	23	NSFTG0045GEFJ	Worm Shaft	AB
15	92P2A401080	Screw	AA	24	NGERH1129GEZZ	Master Cam	AC
				25	MLEVF0281GEZZ	Pinch Roller Lever Ass'y	AN
				26	MLEVF0290GEZZ	Relay Shifter Lever	AE
				27	MLEVC0023GEZZ	Reverse Guide	AG
				28	MSPRD0086GEFJ	Reverse Guide Spring	AA
				29	RM6TN2038GEZZ	Capstan D.D. Motor	AZ
				30	MLEVP0136GEZZ	Slow Brake Lever	AA
				31	MSPRT0329GEFJ	Slow Brake Spring	AA
				32	MSPRC0151GEFJ	Reverse Guide Spring	AA
				33	MLEVF0289GEZZ	Relay Gear Drive Lever	AE
				34	MSLIF0043GEZZ	Brake Shifter	AK
				35	NSFTZ0068GEFD	Brake Lock Shaft	AC
				36	MSPRC0143GEFJ	Absorber Plate Spring	AB
				37	MSPRT0274GEFJ	Video Search Brake Spring	AB
				38	MLEVP0181GEZZ	Video Search Brake Lever	AA

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
39	MLEVP0131GEZZ	Video Search Reciprocating Lever	AC	90	PgiDC0039GEFW	Drum Base	AL
40	RPLU-0083GEZZ	Brake Solenoid Ass'y	AF	91	DDRMW0008HE15	Drum Ass'y	BV
41	NDAiv1046GEZZ	Take - Up Reel Disk Ass'y	AG	92	QBRK0021GEZZ	Earth Brush Ass'y	AC
42	NGERH1128GEZZ	Idler Gear Ass'y	AN	93	RMδTP1106GEZZ	Drum D.D. Motor Ass'y	AY
43	NPLYV0134GEZZ	Reel Pulley	AC	97	QCnw-6479GEZZ	Full Flat Cable	AK
44	MSPRD0085GEFJ	Shifter Spring	AB	99	RDTCH0018GEZZ	Dew Sensor	AG
45	PCδVP1018GEZZ	Shifter Spring Cover	AC	100	QSδCN0534REZZ	Socket, 5 pin (MF)	AC
46	LHLDP1092GEZZ	Cassette LED Holder	AE	101	VRS-TW2ED221J	220 ohm, 1/4W, 5%, Oxide Film	AA
47	RH-PX0180GEZZ	Cassette LED	AD	102	VCKYTV1HB102K	1000pF, 50V, 10%, Ceramic	AA
48	QPWBf2977GEZZ	Reel Sensor PWB	AK	103	VRS-TV1JD473J	47k ohm, 1/16W, 5%, Oxide Film	AA
49	RH-PX0181GEZZ	Reel Sensor	AE	105	LANGA0051GEFW	Take-Up Reel Disk Catch Holder	AB
50	LCHSS0016GEZZ	Reel Block Chassis	AL	106	PgidsS0027GEZZ	Supply Impedance Roller Flange (Low)	AA
51	MLEVP0134GEZZ	Tension Adjusting Lever	AC	107	LANGF7061GEZZ	Release Pin Angle Ass'y	AC
52	MLEVP0195GEZZ	Tension Release Lever	AC	108	PCAPS1018GEZZ	Slow Brake Shaft Cap	AA
53	MLEVP0132GEZZ	Back Tension Lever	AC	113	VCKZPA1HF103Z	0.01μF, 50V, + 80%~-20%, Ceramic	AA
54	MSPRT0273GEFJ	Spring, Fast - Forward	AB	114	QPLGN0229TAZZ	Plug, 2 pin	AB
55	NDAiv1047GEZZ	Supply Reel Disk Ass'y	AH	115	QPLGN0550GEZZ	Plug, 5 pin (MH)	AB
56	MSPRT0272GEFJ	Main Brake Spring	AC	116	MARMP0047GEZZ	V-H Cleaner arm Ass'y	AG
57	MLEVP0135GEZZ	Intermediate Lever	AC	117	RPLU-0085GEZZ	Solenoid Ass'y	AM
58	MLEVP0129GEZZ	Main Take-Up Brake Lever	AE	118	LANGA0059GEFW	Solenoid Stopper	AB
59	MLEVP0128GEZZ	Main Supply Brake Lever	AE	119	LANGT9133GEZZ	V. H Cleaner Sub Chassis Ass'y	AF
60	NGERH1121GEZZ	Loading Relay Gear	AA	120	MLEVP0177GEZZ	V. H Cleaner Drive Lever	AD
61	MSPRT0271GEFJ	Loading Reciprocating Spring	AA	121	MSPRT0317GEFJ	V. H Cleaner Arm Spring	AA
62	NGERH1120GEZZ	Take-Up Loading Gear	AA	122	CCHSS0018GE02	Reel Block Ass'y	AZ
63	MLEVF0304GEZZ	Take-Up Loading Arm Ass'y	AC	123	LHLDW3009GEZZ	Wire Holder	AA
64	NGERH1119GEZZ	Supply Loading Gear	AA	124	QCnw-6414GEZZ	Connecting Cord	AG
65	MLEVF0303GEZZ	Supply Loading Arm Ass'y	AC				
66	LCHSM0108GEZZ	Main Chassis Ass'y	AR				
67	LBNDK1002GEZZ	Tension Band Ass'y	AD				
68	LHLDZ1607GEZZ	Tension Spring Hook Plate	AA				
69	MSPRT0275GEFJ	Tension Spring	AA				
70	MLEVF0291GEZZ	Tension Arm Ass'y	AF				
72	MSLiF0049GEFW	Take-Up Pole Base Slider	AB				
73	LPδLM0037GEZZ	Take-Up Pole Base Ass'y	AG				
74	NRδLP0062GEZZ	Guide Roller Ass'y	AE				
75	MSLiF0048GEFW	Supply Pole Base Slider	AB				
76	LPδLM0036GEZZ	Supply Pole Base Ass'y	AG				
77	PgidM0066GEZZ	Take-Up Loading Rail	AB				
78	PgidM0067GEZZ	Supply Loading Rail	AB				
79	NSFTL0563GEFW	Supply Impedance Roller Innor	AC				
80	PgidH0031GEFW	Supply Impedance Roller Flange	AA				
81	NRδLP0084GEZZ	Supply Impedance Roller	AC				
82	RHEDT0026GEZZ	Full Erase Head Ass'y	AK				
83	QPWBf2936GEZZ	Full Erase Head PWB	AA				
84	LANGA0054GEZZ	Supply Reel Stopper Ass'y	AD				
85	NBLTK0059GE00	Reel Belt	AB				
86	MLEVP0146GEZZ	Auxiliary Fast-Forward Brake Lever	AE				
87	MSPRT0282GEFJ	Auxiliary Fast-Forward Brake Spring	AB				
89	QPLGN0350CEZZ	Plug, 3 pin	AA				

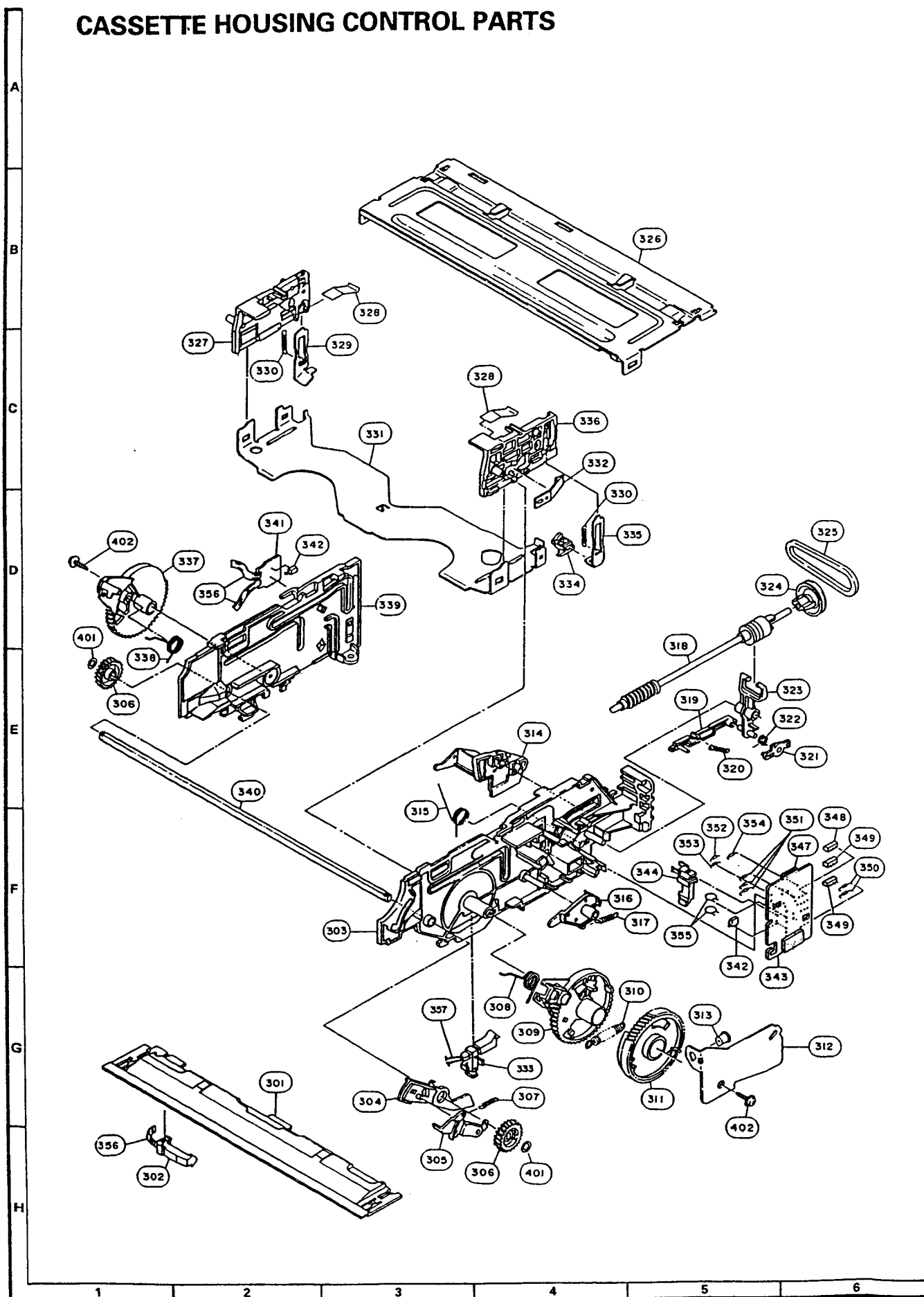
Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
310	MSPRT0277GEFJ	Reciprocating Spring	AA	SCREWS, NUTS, WASHERS AND WIRE CLAMP			
311	NGERW1033GEZZ	Worm Wheel Gear	AB	201	XNFSD20-16000	Adjusting Nut	AA
312	LANGF9355GEFW	Worm Bracket	AB	202	XWHSD26-05060	Washer W2.6S-6-0.5	AA
313	NBRGP0013GEZZ	Bearing	AA	203	XRESJ20-04000	E Ring-2	AA
314	MLEVP0142GE00	Open Lever	AA	204	LX-BZ3095GEFD	AC Head Screw	AA
315	MSPRD0091GEFJ	Open Lever Spring	AA	205	XBPSD26P06000	Azimuth Adjusting Screw	AA
316	MLEVP0141GEZZ	Switching Lever	AA	206	LX-BZ3096GEFD	Tilt Adjusting Screw	AA
317	MSPRT0280GEFJ	Switching Lever Spring	AA	207	XNFSD40-31000	Adjusting Nut (A/C Head)	AB
318	NSFTD0016GEZZ	Worm Shaft Ass'y	AE	208	XWHJZ31-05054	Washer W3.1-5.4-0.5	AA
319	MLEVP0140GEZZ	Clutch Lock Lever	AA	209	LX-WZ1041GE00	Washer W2.6-6-0.5 (LM)	AA
320	MSPRT0279GEFJ	Clutch Lock Lever Spring	AA	210	XHPSD26P06WS0	Screw C2.6P + 6S	AA
321	MLEVP0139GEZZ	Clutch Release Lever	AA	211	XRESJ30-06000	E Ring-3	AA
322	MSPRD0092GEFJ	Clutch Release Lever Spring	AA	212	XWHJZ45-02060	Washer PSW4.6-6-0.25	AA
323	MLEVP0138GEZZ	Clutch Lever	AA	213	LX-NZ3046GEFW	Adjusting Nut	AB
324	NPLYV0135GEZZ	Pulley	AA	215	LX-WZ1003GE00	Washer CW2.0-5-0.5	AA
325	NBLTK0060GE00	Cassette Loading Belt	AB	216	XRESJ12-03000	E Ring-1.2-T0.3	AA
326	LANGF9354GEFW	Upper Plate	AD	217	XHPSD26P03000	Screw S2.6P + 3S	AA
327	LHLDX1013GE00	Slider Holder (L)	AB	218	XHPSD20P03000	Screw S2P + 3S	AA
328	MSPRP0115GEFJ	Cassette Spring	AB	219	XRESJ25-04000	E Ring-2.5	AA
329	LANGF9357GEFW	Slider Lock (L)	AA	220	XWHJZ25-05050	Washer W2.6-5-0.5	AA
330	MSPRT0281GEFJ	Slider Lock Spring	AA	221	XWHJZ25-01050	Washer W2.6-5-0.13	AA
331	MSLiF0044GEFW	Slider	AF	222	XWHJZ25-02050	Washer W2.6-5-0.25	AA
332	MARMP0039GEZZ	Lock Release Lever	AA	223	LX-HZ3043GEZZ	Screw W2.6P + 6S	AA
333	QSW-F0037GEZZ	Auto Load Switch	AD	224	LX-BZ3099GEZZ	Screw WSW2P + 11S(5W)	AB
334	MLEVP0143GE00	Slider Lock Cover	AA	225	LX-XZ3030GEFD	Screw M2 x 4	AC
335	LANGF9356GEFW	Slider Lock (R)	AA	226	XHPSD26P08WS0	Screw C2.6P + 8S	AA
336	LHLDX1012GE00	Slider Holder (R)	AB	227	XJPSD26P08WS0	B Tight Screw C2.6P + 8S	AA
337	NGERW1035GEZZ	Drive Gear (L)	AB	228	XHPSD30P08WS0	Screw C3P + 8S	AA
338	MSPRD0089GEFJ	Drive Gear Spring (L)	AA	229	LX-WZ1040GE00	Washer CW2.5-6-0.5	AA
339	LHLDX1015GE00	Cassette Housing Frame (L)	AC	230	XJBSD20P06000	B Tight Screw 2P + 6S	AA
340	NSFTD0015GEFD	Main Shaft	AD	232	LX-HZ3056GEFD	Screw WSW3P + 10S-6W	AA
341	QPWBF2894GEZZ	End Sensor PWB	AB	233	LX-BZ3064GEFN	Screw SW3P + 6S-Ni	AA
342	RH-PX0176GEZZ	Phototransistor	AE	234	XBPSD26P12J00	Screw SW2.6P + 12S	AA
343	QPWBF3194GEZZ	Start Sensor PWB	AC	235	XBPSD30P05J00	Screw SW 3P + 5S	AA
344	QSW-F0040GEZZ	Cassette Switch	AD	237	XHPSD30P06000	Screw S3P + 6S	AA
347	QS6CN0595GEZZ	Socket, 5 pin	AB	238	LX-RZ3001AEZZ	E Ring (Curl)	AA
348	VSDTC124F/-1	Transistor	AC	239	LX-WZ1042GE00	Washer CW2.7-7-0.5	AA
349	VS2SA937-Q/-1	Transistor	AC	240	LX-WZ1005GE00	1.6W-4-0.5	AA
350	VRD-RA2BE153J	15k ohm, 1/8W, 5%, Carbon	AA	241	XBPSD20P04J00	SW2P + 4S	AA
351	VRD-RA2BE223J	22k ohm, 1/8W, 5%, Carbon	AA	242	XWHJZ25-04050	Washer W26-5-0.4	AA
352	VRD-RA2BE103J	10k ohm, 1/8W, 5%, Carbon	AA	243	XHPSD30P04WS0	Screw C3P + 4S	AA
353	VRD-RA2BE472J	4.7k ohm, 1/8W, 5%, Carbon	AA				
354	VRD-RA2BE332J	3.3k ohm, 1/8W, 5%, Carbon	AA				
355	RC-KZ0028GEZZ	0.047µF, 16V, 20%, Ceramic	AA				
356	QCNW-4789GEZZ	Connecting Cord	AF				
357	QCNW-5421GEZZ	Connecting Cord	AK				
401	LX-WZ1020GE00	Cut Washer (4.2W-6.0-0.5)	AA				
402	LX-HZ3046GEFD	Screw (B Tight BTN3P + 6S)	AA				

Ref. No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
MECHANICAL PARTS				FRONT PANEL PARTS			
601	GCABA3054GES3	Top Cabinet	AR	500	CPNLC1646GE01	Front Panel Ass'y	BC
602	GCABB1081GEZZ	Bottom Cabinet	AR	500-1	JBTN-2309GES A	Button, Eject	AD
603	GBDYU3052GEZZ	Bottom Plate	AG	500-2	JBTN-2308GES A	Button, Power	AB
604	GC6VA1637GEZZ	Antenna Terminal Cover	AF	500-3	GC6VA1562GES A	Power LED Cover	AC
605	LHLDZ1746GEZZ	RF Converter Holder	AB	500-4	MSPRD0103GEFJ	Cassette Cover Spring	AB
606	LHLDZ1610GEZZ	PWB Holder (Sub Chroma)	AA	500-5	QEARP0326GEFW	Earth Plate (Door)	AB
607	LHLDZ1616GEZZ	PWB Holder (System Control / SERVO)	AA	500-6	HDECQ0711GES A	Cassette Cover	AH
608	LHLDZ1616GEZZ	PWB Holder (HiFi)	AB	500-7	HDECE0202GES A	Decoration Panel (Cassette Cover)	AG
609	GLEGP9029GEZZ	Rear Foot	AB	500-8	JBTN-2227GES A	Button, REC.	AA
610	CLEGP9053GE01	Pad Ass'y (Left)	AF	500-9	LHLDZ1665GEZZ	Cassette Cover Shaft Holder	AB
611	CLEGP9054GEZ01	Pad Ass'y (Right)	AF	500-10	QEARP0306GEFW	Earth Plate (Panel)	AC
612	LHLDZ1706GEZZ	Fluorescent Display Holder	AD	500-11	PC6VU9179GES C	Fluorescent Display Filter	AE
613	JKNBP1054GES A	Konb, Slide (A)	AC	500-12	PKAi-0002GEZZ	Door Latch	AD
614	LHLDZ1095GEZZ	LED Holder	AD	500-13	GC6VA1425GEZZ	Infrared R/C Receiver Filter	AC
615	PSPAZ0287GEZZ	Spacer	AB	500-14	HDECQ0597GES A	Front Decoration Panel	AQ
616	JKNBP1060GES A	Konb, Slide (B)	AD	500-15	XEBSD30P10000	Screw	AA
617	LHLDZ1089GE00	Power LED Holder	AA	500-16	HiNDP1761GES A	Indication Panel (Inside the Door)	AG
618	QEARP0276GEFW	Earth Plate	AA	500-17	QEARP0327GEZZ	Earth Tape	AC
619	PSPAZ0288GEZZ	Spacer	AB	500-18	TLABH0470GEZZ	Tuning Label (Inside the Door)	AA
620	LX-HZ3040GEFF	Screw (Top Cabinet)	AA	500-19	LANGF9478GEZZ	Door Holder Angle	AF
621	XEBSD30P12000	Screw	AA	500-20	GD6RF1811GES A	Door	AK
622	XEBSD40P12000	Screw (Power, Mecha)	AA	500-21	HBDGB1005GES A	Badge "SHARP"	AD
623	XHPSD30P06WS0	Screw (H. Amp.)	AA	500-22	TLABZ0766GEZZ	Features Label	AC
624	TCADZ3060GEZZ	SECAM Label	AC	500-23	PSPAV0129GEZZ	Spacer	AB
625	LX-HZ3047GEFF	Screw (Bottom Plate)	AA	500-24	MSPRC0134GEFJ	Earth Spring	AA
626	LANGF9367GEFW	Cassette Holder Angle	AB				
627	PSPAZ0202GEZZ	Spacer	AC				

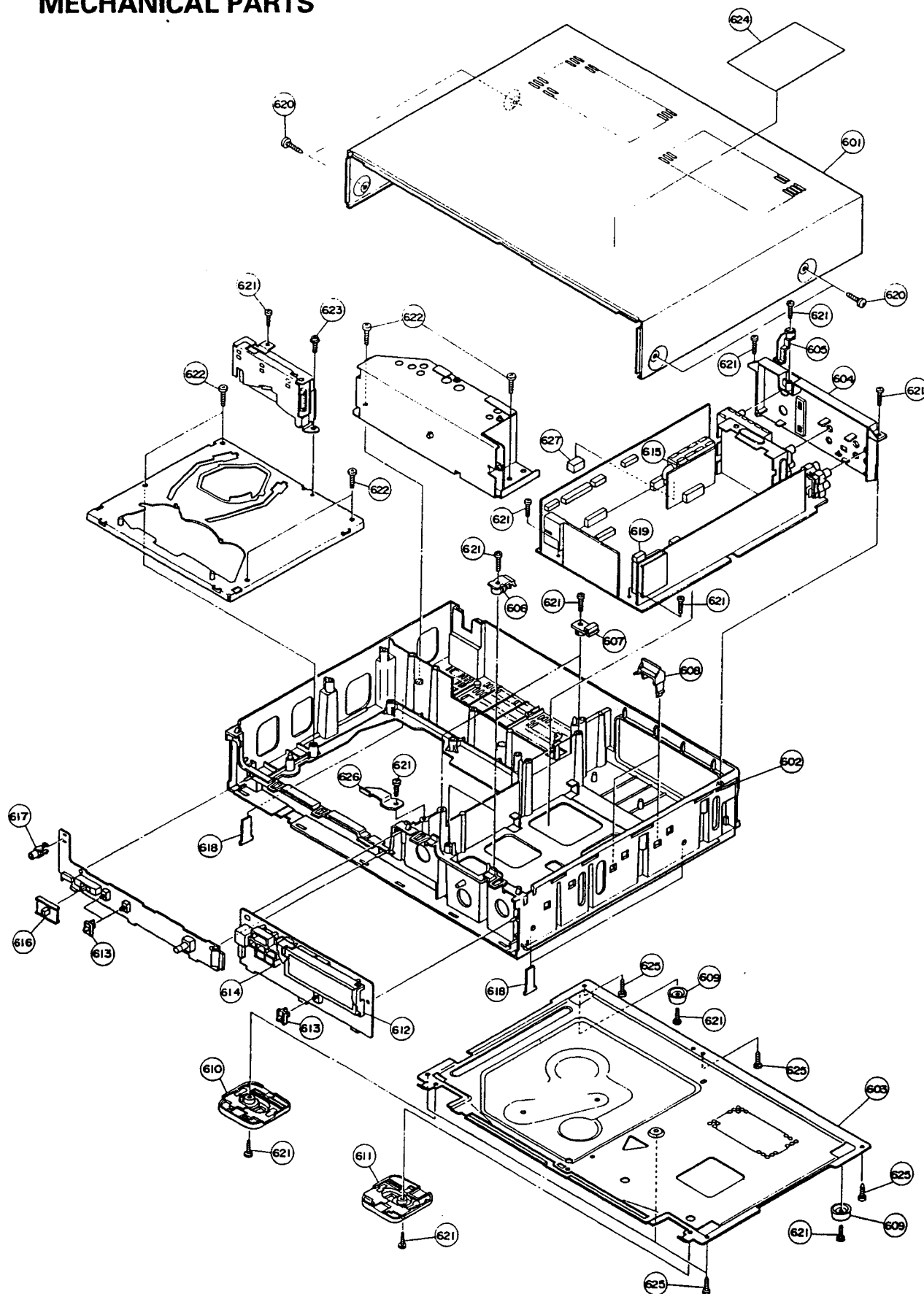
MECHANISM CHASSIS PARTS



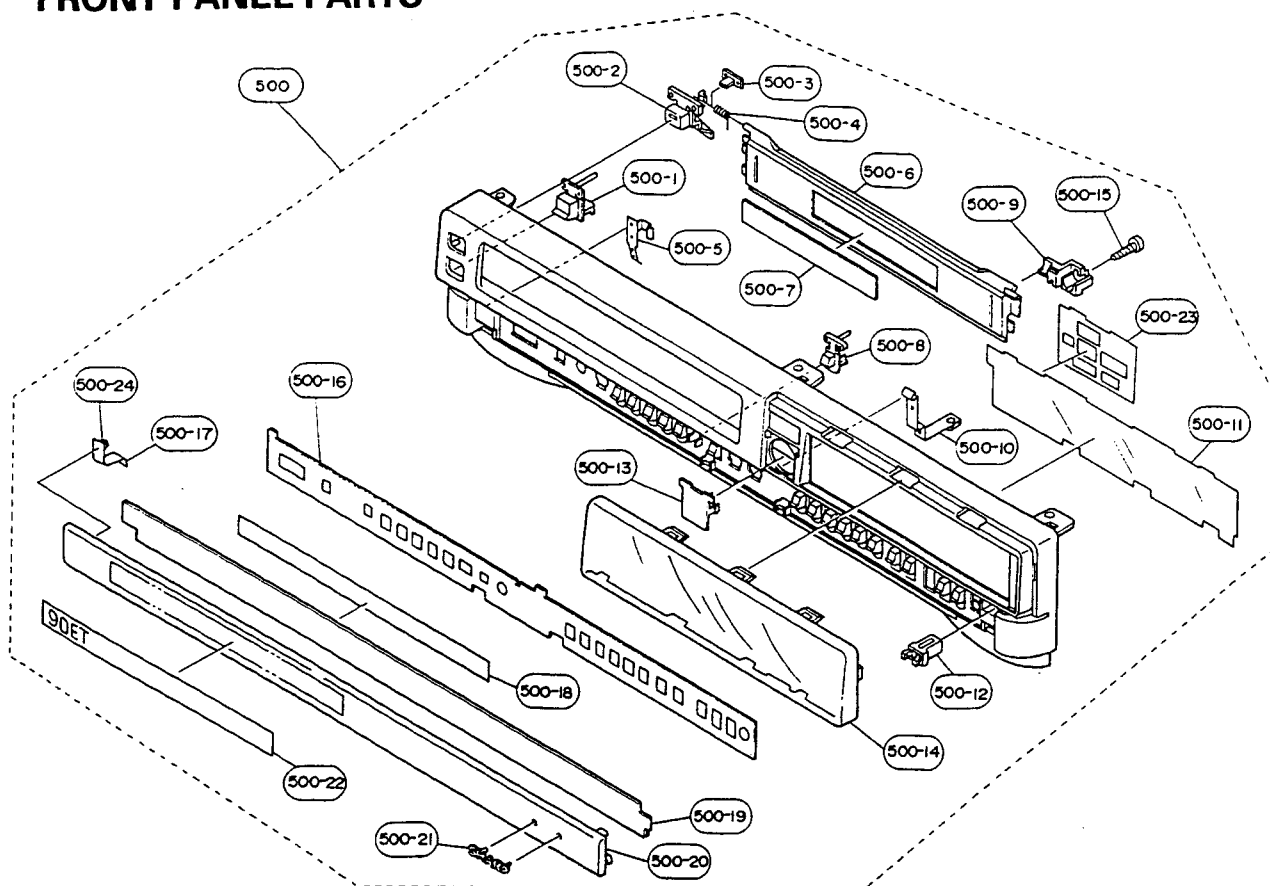
CASSETTE HOUSING CONTROL PARTS



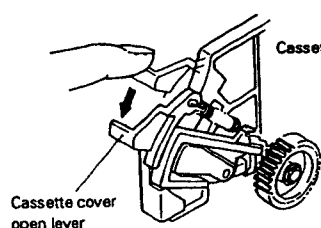
MECHANICAL PARTS



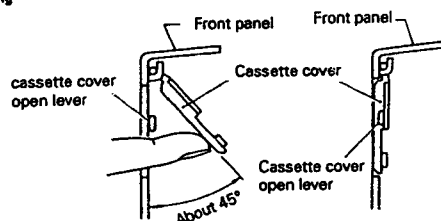
FRONT PANEL PARTS



PRECAUTIONS ON FRONT PANEL SET-UP

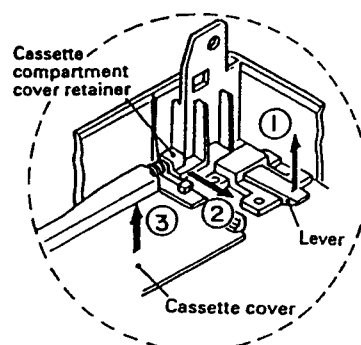


Before attaching the front panel in position, make sure that the cassette cover open lever is in its right place (lowermost). If it is out of position, push it down with a finger.



keep the cassette cover about 45° open and make sure that the cassette cover open lever is between the front panel and the cassette cover. Now fix the front panel in place.

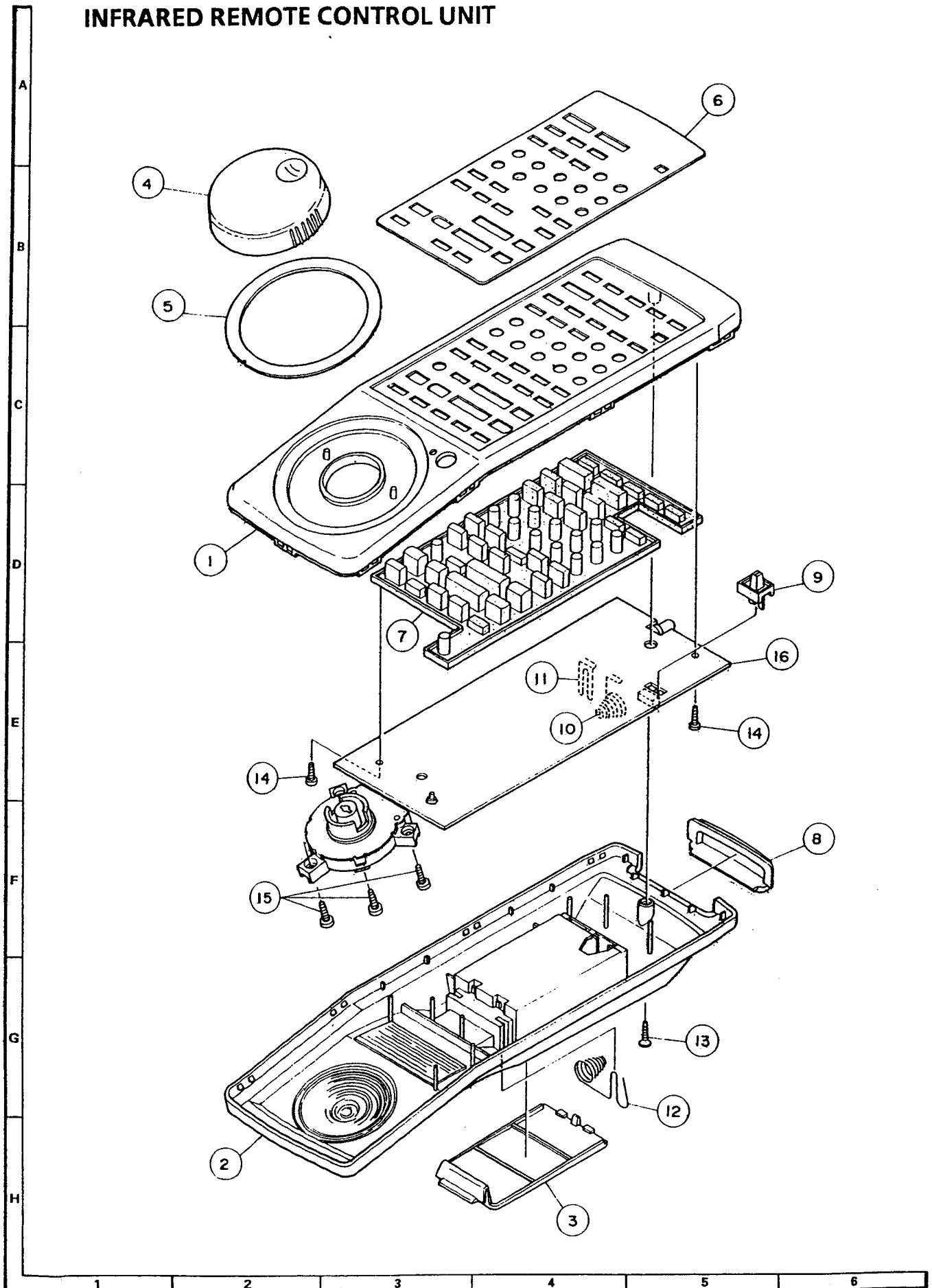
Do not mount the front panel with the cassette cover tilted too open. Otherwise the cassette cover might wrongly run on the cassette housing.



Removing the cassette compartment cover.

1. Lift up the lever in the direction of arrow 1 to shift the cassette compartment cover retainer in the direction of arrow 2.
2. Lift up the cassette compartment cover in the direction of arrow 3 and remove it from the front panel.

INFRARED REMOTE CONTROL UNIT



PACKING OF THE SET

● Setting position of the Knobs

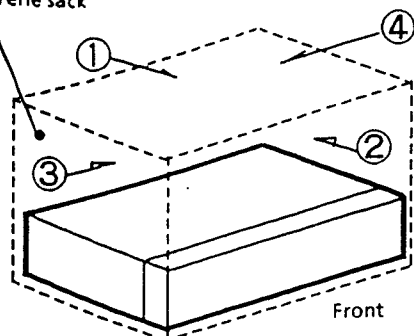
System SW	B/G	Picture tone	CENTER
Colour mode	AUTO	Test signal	at "OFF" Position
NTSC mode	3.58	Audio ATT	at "OFF" Position
SECAM mode	MESECAM		

Accessories

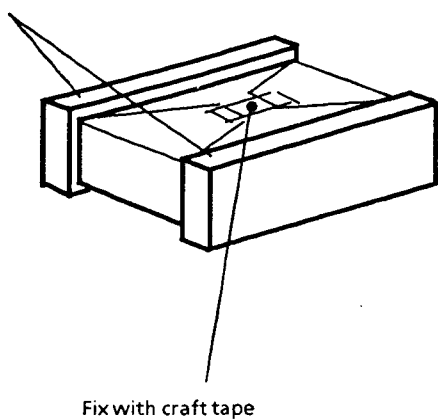
- ★ TiNS - 1636GEZZ
- ★ QCNW-5650GEZZ
- ★ QCNW-6096GEZZ
- ★ QPLGA0011CEZZ

- Operation manual
- Antenna cord
- A/V cord
- AC plug adaptor

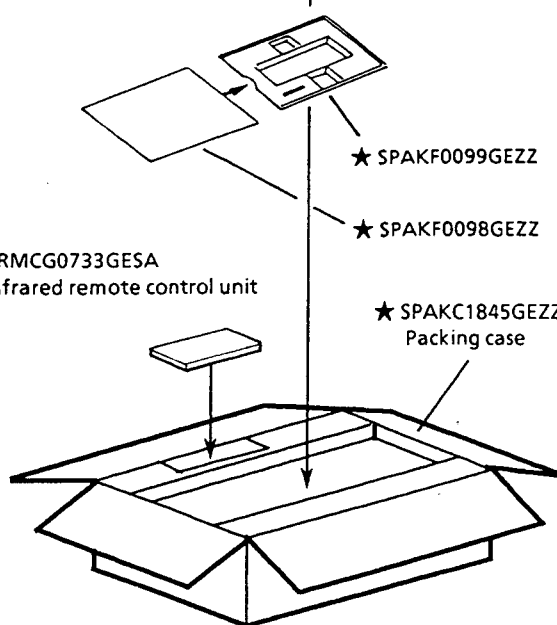
- ★ SSAKA0030GEZZ
Polystyrene sack



- ★ SPAKX0630GEZZ
Buffer material

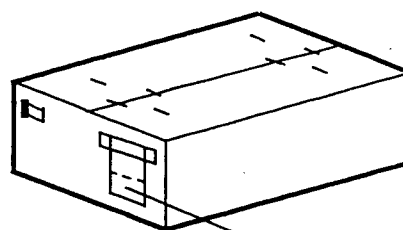


- RRMCG0733GESA
Infrared remote control unit



- ★ SPAKF0099GEZZ Case
Kistchen
- ★ SPAKF0098GEZZ Cardboard
Pappe

- ★ SPAKC1845GEZZ
Packing case



- ★ TLABK2020GEZZ
No. Card

★ Not Replacement Items